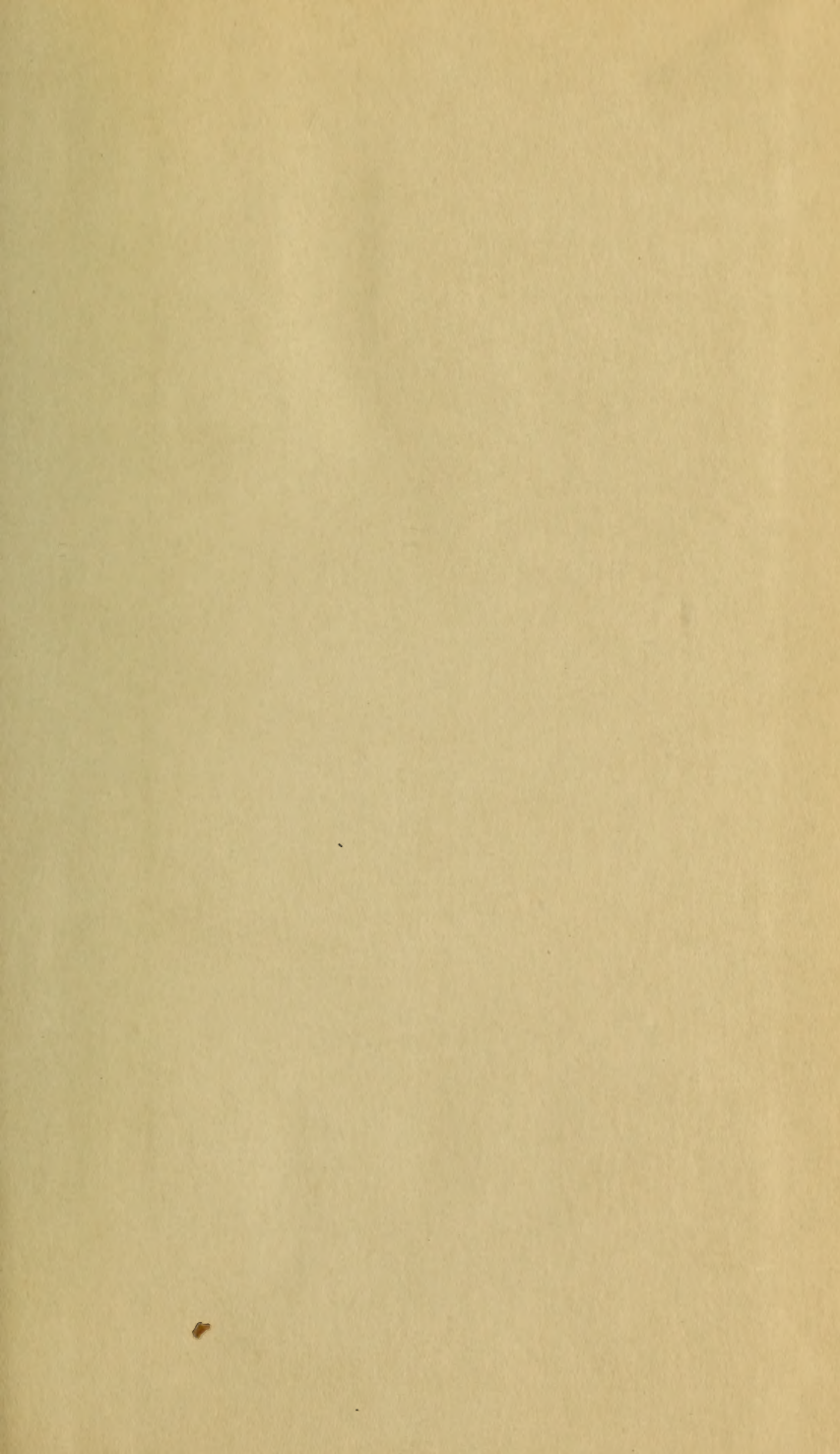




506.73
.P4A1225

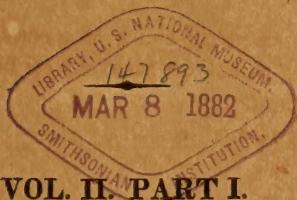
JOURNAL

OF THE

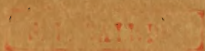
Academy of Natural Sciences

OF

PHILADELPHIA.



VOL. II. PART I.



PHILADELPHIA:

PRINTED FOR THE SOCIETY,

BY J. HARDING.

1821.



CONTENTS

OF

VOLUME II. PART I.

OFFICERS of the Academy of Natural Sciences, for the year 1821.	Page	1
Description of a new Genus, and several new species of fresh water Fish, indigenous to the United States. By C. A. Le Sueur.		2
Descriptions of two new species of Exocetus. By C. A. Le Sueur.		8
Descriptions of the Thysanouræ of the United States. By Thomas Say.		11
Observations on the Geological Structure of the Valley of the Mississippi. By Thomas Nuttall.		14
Notice concerning a new species of American Spider, whose web is used in medicine. By N. M. Hentz.	62	53
Descriptions of some new Crystalline forms of Phosphate of Lime and Zircon. By Dr. G. Tröost.		55
Descriptions of the Arachnides of the United States. By Thomas Say.		59
Analysis of the Blue Iron Earth of New Jersey. By Lardner Vanuxem.		82
Descriptions of several new species of Cuttle-fish. By C. A. Le Sueur.		86
Descriptions of the Myriapodæ of the United States. By Thomas Say.		102
Descriptions of some new species of Plants recently intro-		

duced into the gardens of Philadelphia from the Ar- kansa Territory. By Thomas Nuttall.	114
Observations on several Genera and species of Fish be- longing to the Natural Family of the Esoces. By C. A. Le Sueur.	124
Analysis of some American Minerals. By Henry Sey- bert.	139
On two veins of Pyroxene or Augite in Granite. By Lardner Vanuxem.	146
Descriptions of Univalve Shells of the United States. By Thomas Say.	149
Descriptions of Rare Plants recently introduced into the gardens of Philadelphia. By Thomas Nuttall.	179
Description and Analysis of the Table Spar, from the vi- cinity of Willsborough, Lake Champlain. By Lard- ner Vanuxem.	182
Geological and Mineralogical notice of a portion of the North-Eastern part of the State of New York. By Augustus E. Jessup.	185
Note by Publishing Committee.	192

CONTENTS

OF

VOLUME II, PART II.

Officers of the Academy of Natural Sciences for the year 1822,	page 193
Description and Analysis of the Jeffersonite, a new mineral, by W. H. Keating,	194
On the Gales experienced in the Atlantic States of North America, by Robert Hare, M. D.	204
Description of a New Crystalline form of Quartz, by G. Troost, M. D.	212
✓ Description of five new species of genus Cichla, by C. A. Lesueur,	214
Account of some of the Marine Shells of the United States, by Thomas Say,	221
On a New Locality of the Automalite, by Lardner Vanuxem,	249
✓ Description of three new species of the Genus Sciæna, by C. A. Lesueur,	251
Account of some of the Marine Shells of the United States, by Thomas Say, (continued.)	257
On the Geology and Mineralogy of Franklin, in Sussex county, New Jersey, by Lardner Vanuxem and W. H. Keating,	277
Observations upon the Cadmia found at the Ancram Iron Works, Columbia county, New York, by W. H. Keating,	289
On the Onykia Angulata, by C. A. Lesueur,	296

215-240 m

CONTENTS.

Description of some Crystals of Sulphate of Strontian, from Lake Erie, by G. Troost, M. D.	300
Account of some of the Marine Shells of the United States, by Thomas Say, (concluded)	202
Geological Sketches of the Mississippi Valley, by Ed- win James, M. D.	326
Description of a Quadruped belonging to the order Rodentia, by Thomas Say.	330
Description of a Squalus of very large size, which was taken on the coast of New Jersey, by C. A. Le- sueur.	342
On a South American species of <i>Æstrus</i> which inhabits the human body, by Thomas Say,	353
On two remarkable Hepatic Mosses found in North Carolina, by L. D. Schweinitz,	368
Description of Univalve Terrestrial and Fluviatile Shells of the United States, by Thomas Say,	373
Note,	382
Catalogue of the Library, (continued)	383
List of Donors to the Library,	392
List of Donations to the Museum with the Donor's names,	394
Alphabetical Index to Volume II.	404
List of Plates,	411
Errata,	413

REFERENCE

TO THE

PLATES OF VOLUME II.

Molinesia Latipinna to face page	- - - -	3
Pæcilia Multilineata,	- - - - -	4
Lebias Elipsoides,	- - - - -	6
Exocetus, Nuttallii and Fasciatus,	- - - - -	10
Spider and Crystals, &c. Pl. V.	- - - - -	58
Lollgo Cyclura,	- - - - -	90
Bartramii,	- - - - -	91
Pealeii, -	- - - - -	22
Bartlingii,	- - - - -	95
Illecebrosa,	- - - - -	96
Pavo,	- - - - -	97
Onykia Caribæa and Angulata,	- - - - -	98
Belona Argalus,	- - - - -	125
Truncata,	- - - - -	126
Cichla Aenea,	- - - - -	214
Oscula,	- - - - -	252
Section of Rocks at Franklin, New Jersey,	- - - - -	286
Onykia Angulata,	- - - - -	298
Section of Rocks from the Alleghany to the Rocky		
Mountains,	- - - - -	328
Isodon Pilorides,	- - - - -	343
Squalus Elephas,	- - - - -	350
Sphærocarpus terrestris and Carpobolus orbicularis,		370

ERRATA.

Page 2 line 5 from the top, for *and Say*, read *Say and T. Peale*.

- | | |
|-----|--|
| 5 | 8 for <i>Opeculum</i> , read <i>Operculum</i> . |
| 7 | 7 for <i>and Say</i> , read <i>Say and Peale</i> . |
| 53 | 1 for <i>Webb</i> , read <i>Web</i> . |
| | 3 do. do. |
| 130 | 8 after the word <i>observed</i> add a colon. |
| | 12 after the word <i>species</i> insert a comma instead of a period. |
| 170 | 5 for <i>seven-twentieths</i> read <i>seven-tenths</i> . |
| | 7 for <i>whirls</i> read <i>whorls</i> . |
| 175 | 3 for <i>labrum</i> read <i>labium</i> . |
| 184 | 4 after <i>ammonia</i> insert a comma. |
| | 11 for the first 100 read 150. |
| 243 | 11 for <i>whirl</i> read <i>whorl</i> . |
| | 11 for <i>spine</i> read <i>spire</i> . |
| 257 | 4 before <i>pusilla</i> insert <i>Natica</i> . |
| | 18 for N. read T. |
| 262 | 18 for <i>hirudo</i> read <i>hirundo</i> . |
| 267 | 19 for <i>strialulus</i> read <i>striatulus</i> . |
| 272 | 15 before <i>elevata</i> insert V. |
| 360 | 23 after <i>egg</i> add ”. |
| | 24 dele ”. |
| | 21 dele ”. |
| 372 | 8 from the bottom for <i>Harrigate</i> read <i>Harrowgate</i> . |
| 373 | 3 dele *. |
| | 12 for <i>Harrigate</i> read <i>Harrowgate</i> . |
| 375 | 11 do. do. |
| 376 | 12 do. do. |

JOURNAL
OF THE
ACADEMY OF NATURAL SCIENCES
OF
PHILADELPHIA.

JANUARY, 1821.

List of Officers for the Year 1821.

President.

William Maclure.

Vice Presidents.

Zaccheus Collins, George Ord.

Corresponding Secretary.

Reuben Haines.

Recording Secretary.

Franklin Bache, M. D.

Curators.

Thomas Say, C. A. Le Sueur, J. P. Wetherill,

Thomas M'Euen.

Treasurer.

Jacob Gilliams.

Librarian.

Jacob Peirce.

Committee of Publication.

Thomas Say, Thomas Nuttall, Joseph Dulles,

Isaac Hays, M. D. Isaac Lea.

Description of a new Genus, and of several new species of fresh water fish, indigenous to the United States. By C. A. LE SUEUR.—Read, December 19th, 1820.

Messrs. Maclure, Ord, and Say, from their voyage to Florida, and Mr. Nuttall, in his last journey up the river Arkansa, brought back with them several species of fish, which it is my desire to communicate to this society. Several of them are undescribed, and one of them appears to constitute a new genus, allied to *Cyprinodon*; if we may admit for distinctive character the form of the body, that of the fins, their position, and particularly that of the anal one placed exactly between the ventral fins; the last of which characters appears to me of peculiar importance; it has likewise four or five branchial rays, and the remarkable teeth of *Cyprinodon*, whether or not they exist in the pharynx, as in that genus, I have not been able to ascertain.

The other species of fish which form the subject of this memoir appertain to the genus *Pœcilia*, of Schneider, and *Lebia* of Cuvier.

I would here observe generally, that all these species possess a form of body sufficiently similiar among themselves; that they are all of small magnitude, with the body and neck compressed and elevated anteriorly; the tail compressed, and wide in proportion, but narrower than the anterior part of the body taken between the back and the ventral fin; the head is flattened and terminated by a cuneate snout, cleft crossways by the mouth, of which the jaws are protractile.

GENUS.—*MOLLINESIA.†

Essential Character.

Head flat; operculum large; branchial rays, or gills, four or five. Jaws flattened; mouth horizontal, very small, furnished with small and slender teeth, anteriorly hooked, and with minute posterior ones resembling velvet. Body short, thick, and compressed. Anal between the ventral fins.

Fish of small size indigenous to North America and inhabiting fresh water.

M. *LATIPINNA. Pl. 3, fig. 1.

DESCRIPTION.—Dorsal fin very large, longer than broad, prolonged behind, caudal fin rounded; blackish spots upon the scales; anal fin situated exactly between the ventral, and originating immediately under the dorsal.

Body compressed, short, thick, and most elevated anteriorly. Head flat, horizontal; snout short, cuneiform, opening of the mouth transverse; jaws protractile, furnished with small teeth, anteriorly hooked, posterior ones minute and resembling velvet. Four or five branchial rays. Scales upon the operculum; the head, and the upper part of the body, large. Eyes situated near the summit of the head, distant, the color of a terra sienna yellow, with golden reflections.

† In honor of Monsieur Mollien, French Minister of Finance, a man of science, and one of the patrons of the celebrated Peron.

Scales posteriorly spotted with black, forming interrupted lines. Dorsal fin ornamented with black spots between the divisions of the rays, and with several longitudinal bands towards their base.

The individual being in spirit of wine, I have not been able to judge of the natural color, but Mr. Nuttall, who saw and collected it living, says, that it exhibits a brilliant reddish golden tint.

B. 4 or 5.—P. 16.—D. 14.—V. 16.—A. 6.

Entire length two inches and half. Height taken from the base of the dorsal fin eight lines. Height of the tail five lines. HAB. In the fresh-water ponds in the vicinity of New-Orleans. Very common.

GENUS.—*PÆCILIA*. *Schneider*.

Jaws flattened horizontally, slightly cleft, furnished with a range of small and very slender teeth. The upper part of the head flat: operculum large, rays 3. The body somewhat elongated. Ventral fins a little distant, the dorsal under the anal.

Small fish inhabiting the fresh waters of America.

P. **MULTILINEATA*. Pl. 1. fig. 1.

Dorsal fin small, longer than high, under the anal; lines and black spots forming as many small bands and passing through the limits of each row of scales; caudal fin straight.

DESCRIPTION.—Total length about four times that of the head; the depth about one head. Body compressed, wider towards the operculum, and much

compressed towards the tail, which is high, with a short and truncated fin. Dorsal fin about twice its height in length. Pectoral middle sized, placed about mid-way between the eye and the abdomen. Eyes large, placed near the summit of the head, and approaching the point of the snout, which is cuneiform seen in profile, flat, and wide seen from above. Operculum large, and open in all its length as far as immediately under the eye. The opening of the mouth very small. The teeth of the jaws small, curved, and closed, moveable, and forming a single range in each jaw; the upper jaw as in the *Lebias*, appearing to be formed by the intermaxillary bone. Inferior maxillary bones projecting forward, and disposed in an horizontal line. Head flat, and as well as the gill-covers, the snout, and the sides of the body, covered with large scales. The scales themselves are middle sized, rounded, and concentrically lined.

Color a deep brown-red.

B. 4 to 5.—A. 16.—D. 14.—V. 6.—A. 9.—C. 26.

This small species, of which the individual above described, measured one and a half inches, was brought in the collections of Messrs. Maclure, Ord, and Say, from East Florida, and is indigenous to the rivers of that country.

GENUS.—*IEBIA*. *Cuvier*.

Character similar to *Pœcilia*, with the exception of branchia of 5 rays, and denticulated teeth.

L. *ELLIPSOIDEA. Pl. 2, fig. 1—3.

Body compressed and deep ; dorsal fin higher than long, rounded above the ventral ; a large scapular scale.

Total length of the body three and a half times that of the head, by one and a half in depth. Snout short, jaws very protractile and narrow, armed with compressed and curved teeth, each terminated by three or four points. Head flattened above, between the eyes ; the greatest thickness of the body is between the opercula, very compressed towards the tail. The opercula are large and strong, and without denticulation. Eyes large, approaching the end of the snout, and placed at the summit of the head. Anterior lamina of the operculum, scaly, posterior lamina even, perhaps deciduous. The scales which cover the body are large, and more truncated than rounded, marked with concentric lines. A large scale upon the head between the eyes, surrounded with lesser ones near to the point of the snout. Dorsal fin high, rounded, placed above the ventral, abdominal fins very small, their extremity touching the anal ; the anal fin small and round ; pectoral middle-sized, the extremity prolonged to half the length of the ventral ; caudal mostly unequal, enlarged and elongated posteriorly, and obliquely truncated.

Color a very deep brown.

OBSERVATIONS — There is a membrane attached to the base of the scapular scale, and to the opercu-

lum, closing the opening of the branchia to prevent their too widely separating.

This small species appertains to the genus *Lebia* of Cuvier by its denticulated teeth, and by its possessing four or five branchial rays. It was collected in East Florida, and brought by the party of Messrs. Maclure, Ord and Say. The figure represents the natural size.

B. 4 to 5.—P.—D. 11.—V. 6.—A. 10.—C. 20.

The small fish to which I now call your attention, apparently occupies a place between the Genus *Saurus* and *Scopeles* of Cuvier. The individual here described, is from thirteen to fourteen lines in length, with the body compressed as in the herrings, and having in common with them, the argentine color of the abdomen, with the back of a deep blue. The snout, or terminating portion of the head, is very short, and truncated; the opening of the mouth oblique, the cleft not passing beyond the parallel of the eye; the maxillary bones long, and narrow, the inter-maxillary very small, set with minute teeth, the former, and the wings of the palate are equally furnished with them, as well as the rays which form the opening of the gorge; these rays are prolonged before, in such a manner, that the lower ones appear to form the termination of the tongue; the opening of the gills are large, and continued almost to the insertion of the lower maxillary bones.

According to the above character, this small fish ought apparently to be placed between the two genera

already mentioned. By the vomer furnished with small teeth it cannot appertain to *Saurus* nor to *Scopeles*, in which the palate and tongue are smooth. The scales are large, particularly on the sides, and to the lateral line they are higher. Pectoral fin rather large, continued parallel to the half of the dorsal; ventral small, situated between the abdominal and the pectoral; the dorsal fin placed between the pectoral and the anal; the anal between the two dorsal, of which the second is very small and adipose. The tail long and slender, terminated by a slightly forked fin. Eyes rather large, silvery and gilded, situated contiguous to the maxillary bones and the snout.

B. 4.—P. 15.—V. 6.—First D. 10.—Second D. adipose.—A. 20.—C. 20.

OBSERVATIONS.—I have thought proper to offer some observations upon this small fish, as presenting traits of difference from the genus *Saurus* and *Scopeles*; but I am inclined to think, that it may occur of a greater magnitude. The specimen was communicated to me by Mr. T. Nuttall, the botanist, who obtained it in the river Arkansa.

Description of two new species of Exocetus By C. A.

LE SUEUR.—Read, December 19th, 1820.

EXOCETUS. *Lin. Cuvier.*

The Flying-fish are distinguished among the abdominals by the uncommon magnitude of their pec-

toral fins, sufficient when extended to support the body for some seconds in the air. For the rest, the head and body is scaly, they have likewise a carinated longitudinal range of scales as in the *Belonæ* and *Hemiramphi*, &c. The head is flattened above and at the sides; the eyes are large, the maxillaries without pedicles and forming alone the border of the upper jaw; both jaws are furnished with small pointed teeth, and the os pharynx with teeth in pairs. They have ten rays in the gills; the natatory bladder is very large, and the intestines straight and without cœcum; the upper lobe of the caudal fin is the shortest. Their flight is never very long, and they elevate themselves in order to escape the pursuit of voracious fish; they immediately fall, because their wings merely serve the purpose of parachutes; the birds also pursue them in the air, as the fish do in the water. They are found in all the temperate seas.

*EXOCETUS *fasciatus.*

Abdominal fins long and broad, somewhat truncated, scarcely attaining to the caudal; anal and dorsal, straight, low, and almost equal; pectoral fins not touching the anal; brown bands on the pectoral and ventral fins; the two first rays of the pectoral fins shorter; head destitute of beard.

DESCRIPTION.—The total length of this small species was three inches. The body is elongated and en-

larged towards the head. The back a little flattened. Scales rather large, covering the whole body. The lateral line passes along the sides of the abdomen and touches the abdominal fins. Head flattened above, and slightly carinated to the throat. Eyes distant, at the summit of the head, large and silvery, placed obliquely. Anterior rays of the pectoral fins unequal, the three first simple, and shorter than the fourth and fifth, which are divided like the following. Abdominal fins large, placed nearer to the tail than the head, their extremities rounded, with the first rays simple, and the others divided. The snout a little extended; the opening of the mouth much inclined.

The two individuals which I have seen, the one dried, and the other in alcohol, had lost their color, which was then brownish. It is probable that they are of the same color as the *Exocetus volitans*, and the individuals which I have met with in the Gulf Stream, and in our traverse from the isle of St. Croix to the United States. I saw several of the length of three or four inches, leaping before our vessel, the color of the body of which was a deep blue, with blackish spots on the fins, which appeared very transparent; but I was not sufficiently fortunate to procure any of them.

P. 18.—V. 16.—D. 12.—A. 10.—C. 20 rays.

EXOCETUS **Nuttalli*.

Two large, thick, fleshy, and trilobated appen-

dages pendant from the extremity of the lower jaw ; pectoral fins broad and long, exceeding a little the base of the dorsal ; ventral fins very long, originating near the middle of the body ; dorsal and anal fins large and truncated ; the pectoral and ventral marked with brown bands.

OBSERVATIONS.—This species, as well as *E. fasciatus*, presents brown bands upon the pectoral and ventral fins ; the head is also equally flattened above, and carinated under the gorge. The under side of the body is, however, shorter, less elongated, with the third ray of the ventral fin longer ; the anal fin smaller than the dorsal. The caudal fin lunulated, with the lower lobe longer. Scales over all the body, along the lateral line, and on each side of the abdomen. Eyes large, situated at the summit of the head, and near the extremity of the mouth. Mouth transverse, and rather large.

Color, blue upon the back, argentine and blueish along the sides.

HAB. In the Gulf of Mexico. Communicated to me by Mr. Nuttall.

P.—V. 10.—D. 15. simple.—A. 8.—C. 17.

Descriptions of the Thysanouræ of the United States.

By THOMAS SAY.—Read Nov. 21st, 1820.

Genus MACHILIS, Latr.

Eyes compound, occupying almost all the head ;

abdomen beneath with an appendage for leaping; tail with three styles of which one is above the others.

SPECIES.—M. **variabilis*. Superior caudal process more than double the length of the others; false feet bisetous at tip; colour cinereous or iridescent varied with black.

Inhabits North America.

Cabinet of the Academy.

Body above cinereous, somewhat iridescent, varied with black; gibbous portion of the body not differently coloured; a more or less regular whitish vitta; *false feet* white, hirsute, setaceous at tip; superior caudal process more than double the length of the inferior ones.

Var. a. Body above unicolor, destitute of the white dorsal vitta.

Var. b. Body ferruginous, with dusky lateral spots.

Var. c. Body with several snowy spots each side.

A common insect in many humid places, probably in almost every temperate part of North America. We observed it as far south as East Florida. It is subject to a great many variations.

Genus—PODURA.

Antennæ four jointed, filiform, terminal joint entire; body cylindrical; trunk distinct.

SPECIES.—1. P. **fasciata*. *Body* yellowish-white with four distant black bands; *tail* black; bands

paler beneath; *spring* white; *antennæ* blackish; *eyes* black.

Length one-twentieth of an inch.

Cabinet of the Academy.

In considerable numbers under the bark of decaying Live Oak, &c. in Georgia and East Florida.

2. P. **bicolor*. *Body* plumbeous; *feet* with a few hairs, rather paler at base; *nails* small, acute; *spring* large, white; *eyes* deep black.

Length from one-tenth to three-twentieths of an inch.

Cabinet of the Academy.

Our most common species, under stones, &c.

3. P. **iricolor*. *Body* blackish, iridescent; *thorax* with long hairs before; *abdomen* hairy at tip; *feet* hairy, whitish; *head* beneath and *antennæ* hairy.

Length nearly one-fifth of an inch.

Cabinet of the Academy.

Inhabits Pennsylvania, common.

Genus—SMYNTHURUS. Latr.

Antennæ attenuated towards the tip, four jointed, ultimate joint composed of many smaller ones; trunk and abdomen united into a rounded mass.

SPECIES.—S. **guttatus*. *Body* yellowish-white, with numerous reddish-brown, irregular spots, disposed in bands; numerous, sparse, white hairs, and two tubercles each side of the middle, which are truncated at tip; beneath white; *antennæ* reddish-brown, hairy; *face* maculated, a line of irregular

spots behind the eyes; *eyes* black; *spring* flesh-coloured.

Length rather more than one-twentieth of an inch.
Cabinet of the Academy.

Found under the bark of the long leaved Pine,
(*P. palustris*) in Georgia.

Observations on the Geological Structure of the Valley of the Mississippi. By THOMAS NUTTALL. Read, December 1820.

§ I. THE PROBABLE LIMITS AND CHARACTER OF THE
SECONDARY FORMATION.

The near approach which the calcareous and other strata west of the Alleghany mountains make to the horizontal line, considering their inherent character, has been a matter of surprise to those who are any way familiar with the geology of Europe. A number of hand specimens, which some years ago I compared with what is called the compact mountain limestone of Derbyshire, in England, presented not a single dissimilar feature, either in regard to composition or organic reliquiæ; and I am fully satisfied, that almost every fossil and shell figured and described in the "*Petrificata Derbiensia*" of Martyn are to be met with throughout the great calcareous platform of the Mississippi valley. We everywhere, perceive the same host of *Terebratulites*, *Alcyonites*, and *Encrinal vertebræ*; the same zoophi-

tic casts, and vegetable impressions, likewise attend the coal formations, and it is only the difference of their elevation above the horizon which in any manner distinguishes the same strata in one country from those of the other. Here, however, the difference is sufficiently obvious. In Derbyshire, and in every other part of England of which I possess any knowledge, the beds of coal are never come at by any thing like an horizontal drift; indeed, the dip of such strata is often but little inferior to that of the primitive rocks, and expensive machinery is always necessary, both to raise the coal and drain the mine. In the western states of America, on the contrary, the coal is obtained by an almost horizontal drift, and draining becomes unnecessary. If we are then to search for any transatlantic region similar in its materials and in their horizontal stratification with the extensive plains of Ohio, of Michigan, Indiana, Illinois, Kentucky, West Tennessee, and a part of the territory of Missouri, it is to be found in those extensive plains or steppes of the Tartarian desert traversed by the Kuban, which have been described by Professor Pallas and Daniel Clarke. Here, I think, we find strata of the same materials, at least, as it regards calcareous rock, abounding with fossil reliquiæ, and also as nearly approaching the horizontal level. As we pursue, however, our enquiry concerning the western and northern limits of this great calcareous platform, through Canada, and the territories of Missouri and

Arkansa, we shall perceive that the same materials are also elevated into ranges of hills, dipping from the horizontal level, though still at a far inferior angle to that which prevails in those transatlantic countries above noticed.

In the summer of 1809, my attachment to the study of Botany, induced me to make a pedestrian tour round the greatest part of the southern shore of Lake Erie, to Detroit, from whence I proceeded in a canoe along the same coast of the Huron lake to the island of Michilimakinak, situated near its commencement. I then took a southwest direction along the coast of Michigan, to Green Bay; thence to the banks of the Mississippi, by ascending Fox River, near to its source, and embarking on the Ouisconsin, which disembogues itself two miles below the village called Prairie du Chien. I then descended to the town of St. Louis. This route, and the subsequent voyages which I made up the Missouri and Arkansa, afforded me an ample opportunity of instruction, as to the extent and character of this vast platform of secondary formation.

The coast of Lake Superior I was then prevented from examining, by the sinister regulations of the company of the north-western fur-traders. Some remarkable facts, however, concerning this lake, and the minerals of its southern coast, are detailed by the adventurous Captain Carver, and afterwards corroborated by the relation of M^r Kenzie. Such are the accounts of the masses of native copper scattered along the shores of the bay, called Fond du Lac.

The existence of this fact did not fail to excite the avidity of adventurers, who were, however, disappointed in the pretended quantity and locality of this native metal. But although there is every reason to consider the masses of this metal, as well as others which were shown to me during this route by a chief of the Monomnies, collected near the outlet of the river St. Croix of the Mississippi, as entirely adventitious in their relation to the surrounding strata, still even these insulated facts justify us in supposing them as strongly indicative of the approaching termination of the secondary formation in this direction. We cannot yet indulge our inquiries to any advantage any further to the northward, as none of the other travellers in this quarter have favoured us with the smallest ray of geological information. Still we are led to suppose that the Falls of St. Anthony,* no less than the numerous portages and rapids of the Utowa river are occasioned by some considerable deviation in the strata from that almost horizontal position which they otherwise present. This opinion, however, as it regards the Mississippi, amounts to nothing more than conjecture, for, as in the beds of many other rivers, there is no possibility of deriving any information regarding the nature of its sources from the debris or gravel deposited along its banks, knowing, as we do, the wide extent of

* According to the observations communicated to me by Major Long, testaceous lime-stone exists both above and below these falls.

adventitious granitic gravel and boulders throughout the western states and territories. It is true, that around the Prairie du Chien, and many other places along the banks of the Mississippi, as well as those of the Missouri, and even to the borders of the Arkansa and Red Rivers, rounded debris occasionally appear, sufficiently distinct from any thing which we have met with either in the beds of the St. Lawrence and its lakes, or along the Ohio and its tributary streams; such are the different varieties of fine calcedony, far more resembling those of India than of Europe, and which we term carnelian, sard, &c. as they vary in color and texture, being either red, hyaline and white, or different shades of yellow; all these varieties, and possessing every requisite beauty for the lapidary, are to be met with in considerable abundance along the Missouri, less plentifully on the gravel bars of the Mississippi, while little more than their existence is ascertainable, along the banks of Red River and the Arkansa. To what class of rocks or strata these were to be attributed, as they appear on the Mississippi and the Missouri, I never was able to ascertain; nor am I still much better informed on the subject, although I have had an opportunity of observing a singular granulated rock, in which they are occasionally imbedded, bassetting out from under the more recent testaceous lime-stone of Red river, about one thousand miles above its entrance into the Mississippi. My uncertainty as to the true locality of these rounded chalcedonic debris, arises from

the ambiguity inherent in all conglomerates, which merely mark the transition of one formation into that of another, and are thus almost intermediate betwixt every species of transition whether general or partial. There is, I think, reason to believe, that most of the finer chalcedonic geodes, which appear in the form of pebbles of various sizes, originate almost uniformly in those transition rocks which we term amigdaloids and conglomerates, and though porphyries, as approaching more nearly to the class of rocks called primitive, are artificially distinguished from them, there exists, in fact, no such natural precision of limit.* At all events, the presence of these chalcedonic debris, if not more remotely adventitious, would appear to point out in this quarter, the termination of the calcareous platform, somewhere below the sources of the Mississippi as well as those of the Missouri.

Descending the St. Lawrence, or rather its chain of lakes, we perceive even along the southern coast of the Huron, very intelligible indications of the approaching termination of this secondary formation, in the vast beds, as I may call them, of adventitious granitic rocks, which for more than one hundred miles in succession, continue to line its shores. Many of these blocks, which are in places collected and extended into the lake for ten or twelve miles together, are of a magnitude so enormous, as to have

* One or two specimens of hyaline calcedony, I once found on the gravel bars of the Missouri, imbedded in a white Jasper

long acquired the veneration of the Indians, and are justly considered as their perpetual land-marks. We cannot reasonably suppose that this enormous collection of adventitious rocks can have been very far conveyed from their original situation ; still from the existence of facts, it does not appear that the Huron lake constitutes a boundary betwixt these formations. If I mistake not, both Kalm and Carver inform us of the existence of fibrous gypsum or alabaster on the banks of the Utawas ; a river, which by the aid of inconsiderable portages, affords a navigable communication from Montreal to French river of lake Huron. In connection with this formation is found the softish brown-red argillaceous stone, so much esteemed and employed by the Indians in the manufacture of their pipes. By Carver, and others, it is improperly termed a serpentine, but appears to be merely a clay-stone, of which I then obtained a specimen from the river in question. There is also equal reason to credit the existence of fibrous gypsum in that country, of which I received specimens during my stay at the island of Michilimakinak. Hence it would appear, that we are to search for the termination of the stratum we are tracing beyond the northern shores of the Huron, and that it in all probability ceases where the fibrous gypsum and red clay-stone commence.

This calcareous platform is not even disturbed by a single elevated hill along the whole southern border of lake Erie. The ridge, however, traversed by the cataract of Niagara, and the falls of Genessee,

generally marks the termination of this stratum throughout its course, which terminates westwardly near to the proper commencement of lake Ontario. In several parts of this ridge and its vicinity gypsum has been found, as at the falls of the Genessee, at the outlet of Owasco lake, and also contiguous to the falls of Niagara. The Table-Rock, from whence visitors commonly view the stupendous cataract, is in great part a mass of gypsum; which, continually moistened by the falling spray and the neighbouring springs, carries down a portion of the dissolved mass, which is afterwards deposited in rounded nodules in the cavities below. In these rocks we also discover small nodules of galena and the blende ore of zinc, which is more or less prevalent throughout this ridge as far as Grand River in Upper Canada. In the dark grey gypsum of Genessee, employed in agriculture, there exists a considerable admixture of carbonate of lime. About fifteen or twenty miles west from Queenstown this ridge presents considerable beds of calcareous breccia, or dislocated angular fragments, again collected and cemented in a base of the same material. Mr. Maclure traced this calcareous stratum, with its concomitant accompaniment of shells and hornstone nodules, as far as the borders of Lake Champlain, where it terminates in the immediate vicinity of the primitive on the west, and an elongated point of the transition on the east.

The very imperfect knowledge which we yet possess of the western regions of the Mississippi, pre-

vent us in a great measure from arriving at any very satisfactory results, while pursuing our enquiries in this direction. Before entering upon this part of the subject, it is necessary to make some remarks upon the anomalies which present themselves towards the western and north-western confines of the calcareous platform. Thus, on arriving at the banks of the Ousiconsin, instead of an almost imperceptible current, as that of Fox river and its lakes, we are carried along at the rate of three or four miles per hour, and have almost uninterrupted hills on either bank of the river; still there is no very considerable dip, but sufficient to bring into view a considerably lower portion of the stratum, in which veins of galena or lead-ore begins to make their appearance. Captain Carver, and afterwards Mr. Dickson, received from the Indians a grant of these lead-mines, which Mr. Dickson informed me, promised to be no less productive than those they gave to Monsieur Dubuque, situated on the western side of the Mississippi, and about 40 miles below the entrance of the Ouisconsin. The same calcareous lead-hills are met with dividing the branches of the Meremek, about thirty miles below St. Louis, and continue in a south-west direction to the sources of the river St. Francis. They are again met with on the banks of White River, and galena has also been found near the banks of Grand river of the Arkansa. The first occurrence of secondary calcareous rock on the banks of the Arkansa, is towards the base of the arenelitic

hills of Lee's-creek (called Papillon, in Pike's map) and about eight miles below the garrison of the Pottoe. Lime-stone is found along the banks of the Salais-eau, a few miles above the former, but we nowhere meet with any considerable quantity of calcareous rock, in that part of the Arkansa territory which came under my notice, excepting on the banks of Grand river, whence the garrison was supplied with lime for building. As indications of coal, however, appear in this quarter, on both sides of the river, and even near the garrison, along the banks of the Pottoe, accompanied by the usual fossil reliquiæ, we are not to suppose that the secondary calcareous stratum is so limited in its existence in this direction, but merely covered by the sand-stone with which the occurrence of coal is concomitant. This circumstance, again, almost independent of any collateral observation, points out the extraordinary approach of these strata towards the horizontal level; for, from Lee's creek to the northern branches of the Canadian, and from thence to the great Saline river of the Paunees, a distance, over land, of near 300 miles, on the southern side of the Arkansa, we were never able to discover a solitary specimen of calcareous rock, being every where covered by the sand-stone, and in no place presenting a derangement or dip sufficient to be exposed from beneath. It is almost unnecessary to add, that a country like this, presents little else than one uniform plain, in general destitute of arborescent vegetation, and that it is also very defi-

cient in springs of water. While on the contrary, the calcareous country of the Salaiseau, of Grand-river, of the Illinois, of Arkansa, and also the undulated arenelitic lands towards the borders of the great Saline river, abound in springs, that continue to flow throughout the hottest months of the summer, and produce around them morasses, which from their deceiving depth, are dangerous to the approach of the larger quadrupeds.

While ascending the Missouri in the summer of 1810, I could not ascertain the existence of the compact calcareous rock, containing organic reliquiæ, beyond the confluence of the river Platte; yet the sand-stone hills, and woodless plains, in the rear of the Maha village, were precisely such as we met with along the northern borders of the Arkansa, within the limits of Pottoe, and the Saline rivers. In the territory of Arkansa we could no where distinctly ascertain the existence of those more ancient and deep beds of uniform argillaceous matter which so often along the banks of the Missouri, bury out of sight the inferior rocky stratum, in such a manner, as at length entirely to conceal its character. This clay formation, entirely unconnected with that of the Mississippi, and the lower part of the Arkansa, is of a blueish-grey, abounding in pyrites and xylanthrax, and is the active seat of those pseudo-volcanoes and their remains existing in the upper part of the Missouri territory. Excepting wood, even whole trunks of trees, in every state of siliceous penetration and petrification, a fossil *Ostrea* or mya, and what my friend Mr.

Thomas Say considered as an unknown species of baculite,* no other organic remains were noticed by us in this vast deposition of argillaceous matter, which often appeared near the bank of the river in blackened sterile hills and cliffs of from two to three hundred feet elevation. It is highly probable that the fossil crocodile skeleton, or *proteasaurus*, mentioned by Lewis and Clarke, was deposited in this argillaceous bed, although I once found, on the loftiest summits of the gravel hills of White River of the Missouri, several fragments of large fossil bones, apparently vertebræ, accompanied by some eburneous process partly transformed into silex.

The calcareous cliffs which border the Missouri, not far from the creek of the Maha village, more closely resembled chalk than any thing of the kind which I have heretofore seen or heard of in North America, but cannot by any means be identified with the same formation in the south of England and in France. We could not discover in it any organic reliquiæ, nor any vestiges of flint. It is, nevertheless, sufficiently white, meagre, and absorbent, when moistened, and marks with facility. Connected apparently with this anomalous formation of chalk, we observed considerable beds of what appeared to be stalactitical gypsum, but whether a more general de-

* Published in Silliman's Journal. vol. II. p. 41, under the name of *baculites compressa*.

position, or a mere adventitious production formed by the partial agency of the decomposed pyrites so prevalent in the argillaceous bed above noticed, I am not prepared to ascertain. It occurred in seams, though divided into small and rounded masses, perfectly white, but so devoid of the fibrous structure as to be readily confounded with the chalk. The similarity of this secondary calcareous formation on its opposite confines in East Tennessee, as it appears immediately after crossing the Cumberland gap is deserving of attention; here again the calcareous rock puts on the appearance of chalk, and even contains nodules of flint, but bordering too much on chalcodony to afford the character requisite for economical purposes.

Before taking leave of this part of our subject, and indeed not unconnected with it, is the anomalous deposition of salt, and the production of nitre. We all know that the impure nitre of the western states, of which the greatest abundance has been found in the neighbourhood of the Cumberland ridge of mountains on the confines of East Tennessee, is always connected with the caverns of calcareous and arenilitic rock, and that it is not an accidental production, arising from the decomposition of animal and vegetable matter, is indeed proved by its gradual renewal in those caverns which have been exhausted. As I have been informed, it exists in the calcareous and sandstone rocks which are consequently attacked by the humidity of the air, and so falls into earthy fragments, which are

collected for lixiviation, and that the solid stone itself is also occasionally broken and submitted to the same process. I am not acquainted with the existence of many localities of nitre on the west side of the Mississippi, though it has been obtained in considerable quantity along the banks of the Meremek, and some of the streams emptying into the lower part of the Missouri. The Hirundel rocks on the banks of the Arkansa possess the only appearance of affording nitre which I have seen in that territory.

I have termed the production of salt in this formation as anomalous, regarding any connection which it bears with the ordinary gypseous or red-clay formation of the European geologists. No doubt numerous remarks have been made upon this subject, which I now merely examine as a matter of fact. Every one knows the abundance of salt springs which exist in the valley of the Ohio and its tributary branches. The most productive among them are the springs of the Kenhaway and the Big Bone Lick. Those of Onondago Lake, in the western part of the state of New-York, are no less important. In my enquiries and personal examinations, I must confess myself to be generally at a loss to ascertain the proper origin of these springs. In no instance is this salt met with in a solid form, nor in distinct connection with gypsum, or with *red* coloured clays. The argillaceous soils, indeed, which do occur, are dark gray or grayish blue. At the Big Bone or Mammoth Lick on the Ohio, and in many other places, where

fossil bones have been found in their immediate neighbourhood, we should have been led to suppose these springs to be in connection with ancient alluvial deposits; while on the other hand, where the boring and obtaining of salt water has been continued through beds of coal and of limestone for some hundreds of feet, every idea of alluvial origin must vanish, and we are led to consider the existence of these saline springs as coeval with the strata in which they originate, in common with the nitre, the petroleum, and the coal. The occurrence of those remains of extinct quadrupeds which are found in their vicinity, may be considered as accidental, or merely connected with their relish for salt.*

The extent of these salt springs is nearly as wide as that of the secondary rocks which they accompany; thus they are found in several places along the banks of the Mississippi, from the Prairie du Chien to the confluence of the Ohio, wherever the intersection of streams have afforded them an outlet. They occur along the banks of the Meremek near to St. Louis, and along the Missouri to the Osage river; they are met with on the banks of this river almost to its sources; they reappear along the borders of

* These relics are the bones of the common mammoth or mastodon of the Ohio, the Siberian elephant, or true mammoth, teeth of the rhinoceros, and in the caves have been found the bones of the megatherium, a very fine collection of which were in the cabinet of the late Mr. Clifford of Lexington.

Grand River of the Arkansa, fifty miles up which river, one of the principal springs is now worked. This place I have carefully examined. Here the springs, which are uncommonly clear, strong, and copious, distinctly and immediately issue through a bed of calcareous rock, and are accompanied by a stream of sulphuretted hydrogen gas, but occasioning only a minute deposition of sulphur. Other springs, equally productive, likewise occur in the distance of twenty-five miles further up this stream. The Cherokees have discovered springs of salt water on the banks of the Illinois of Arkansa, but in this quarter as well as on the banks of Grand River, they do not happen to be accompanied by any remains of quadrupeds.

Unconnected with this soil and strata, though scarcely with our subject, is the gypseous Red Clay formation, and the salt which it affords. Of the existence of this salt formation towards the sources of Red River, there is the most unequivocal evidence; it is the abundance of this mineral, independent of that of the calcareous stratum, which so frequently communicates, particularly in the inundation of the Red water, a sensible brackishness to the whole stream of the Arkansa, and occasions its water to be preferred by all the wild and domestic animals. Indeed, in dry seasons, like that of the last autumn, (1819) a saline efflorescence was sufficiently visible over all its argillaceous deposits. The locality of this red clay soil is sufficiently attested by a slight

attention to the color of the streams which empty into the Arkansa; thus, all the rivers which enter from the north or north-west, bring down either water which is clear, or rendered turbid with grey colored earths and clays, while on the opposite side come in a number of streams which are charged with turbid water, always of a reddish brown color. Such are the Canadian, and the three Saline rivers, whose waters, except that of the former, are at all times impotably saline. Still further tracing the locality of this production, we find that the red water of the Canadian is the produce of its main southern branches, which all the hunters and traders assert to derive their sources with the head waters of Red river, and the Spaniards inform us, as a well known matter of fact, that Red river originates in the mountains of Santa Fe, of Rio del Norte. The northern branch of the Canadian is said to proceed almost parallel with the Arkansa, and possesses clear water in common with its tributary the lesser North river, which sources in the immediate vicinity of the Arkansa, and makes a very near approach to the great Saline river of the Paunees, already mentioned. It is in the immediate neighbourhood of the second river of Saline water, that Dr. Sibley was conducted by the Osages to what are commonly called the salt plains, where this mineral appears in place, and lies scattered over the surface of the ground. These beds of salt and clay very improperly and vaguely laid down in the maps as so many lakes of salt water, are nothing

more than the neighbouring beds of red clay, which occasionally inundated, and washed by the winter rains, afterwards deposit a copious efflorescence of the dissolved mineral.

From three experienced hunters who had spent a great part of their lives in this country, and penetrated to the western mountains, I received accounts of the prevalence of a mineral towards the sources of Red river, which, on producing specimens, turned out to be fibrous gypsum, similar to that of the Utawah river, in Upper Canada; it was said to be very abundant and continuous in its appearance. My guide, Mr. Lee, first observed it on the banks of what the French call the False Washita, one of the principal northern branches of Red river. A river of saline water too brackish to drink, as I was informed, enters the river Platte from the south, about thirty miles above its confluence with the Missouri. The Sioux river entering the Missouri from the north, according to the report of the interpreter (Dorion) who accompanied us in our voyage up the Missouri, in 1810, informed us, that this river sources with the St. Peters, and after remaining navigable for upwards of two hundred miles, is then obstructed by a cataract, and that below the falls a creek enters from the eastward, after passing the cliffs of the red clay-stone employed by the Indians in the fabrication of their pipes.

From what we can glean concerning this principal formation of salt and gypsum, it would appear to be situated in the vicinity of the primitive mountains,

and at all events marks the termination of the secondary soil.

The fluat of lime, so abundant and beautiful in the secondary calcareous rock of Derbyshire, in England, is not altogether wanting in the valley of the Mississippi. In 1810, Mr. J. Bradbury favoured me with very fine specimens of white, blue, and amber colored fluor, from a lead mine, at the Rock and Cave, in the vicinity of the Ohio. Another locality of this mineral was pointed out to me, also in 1818, as existing near Centreville, in the county of Logan, in Kentucky. In the same locality with that described by Mr. Bradbury, Mr. Jessup found it in abundance on the surface for a space of thirty miles, accompanied by a vein of galena. In its vicinity, Mr. J. also met with nodules of argillaceous iron ore, containing blende. But fluor has never yet been found on the banks of Missouri, as asserted by Mr. Claiborne.

The floetz trap formation, or that variety of it, termed in Derbyshire, *toad stone*, and which there so signally deranges the strata and metalliferous deposits, in no form makes its appearance throughout this secondary platform, the only anomalous bed in any manner analogous to this, is the greenish, and apparently ferruginous arenilitic rock, with a sparry calcareous cement, and bordering on grauwacke, which appears beneath the newer floetz lime-stone of Red River.

Having thus taken a cursory, but imperfect view of the great tabular formation of secondary calcareous rock, which gives place to the immense plains and lakes of the western states and territories, we shall next proceed to offer a few remarks upon the ancient maritime alluvium, and a floetz formation apparently connected with it, which continues from Rhode Island to the coast of the Gulf of Mexico, principally with a view to ascertain its south-western limits, and to observe the influence which it has had in producing the present character of that part of the Mississippi valley. The accurate and comprehensive view of this formation, as well as of all the others composing the North American continent, by our absent president,* the result of observations continued for many years in succession, leaves us little more to do than corroborate his assertions by additional details, and an extension of its limits into the remoter territories of the Union.

§ II. LIMITS AND CHARACTER OF THE ANCIENT MARITIME ALLUVIUM.

The extent of the primeval ocean, and the vast agency which it has exercised over our globe, to render it habitable, and thus to complete the plan of creation, is evinced by a vast proportion of its surface wherever our observations are directed. That

* William Maclure, Esq.

immense portion of the valley of the Mississippi, over which we have in the preceding section rapidly glanced, without entering into details, exhibits throughout all its extent unequivocal marks of a pelagian origin, its rocks are filled with marine productions, with bivalve shells, with Alcyonites, Encrinites, Madrepores, Millepores, Tubiporites, Flustras, Trilobites, some species of Ammonites, Zoophytes, &c. &c. of which by far the greater part are now extinct, having disappeared with the ocean that gave them birth; indeed, several of their genera no longer possess any existing type. The antiquity of this order of things, apparently anterior to the creation of any other organized beings, is beyond our comprehension; what occasioned the reflux and subsidence of these mighty waters, and the consequent elevation of the land, is a subject equally involved in mystery. It is sufficient for us to mark the different epochs of this reflux, so as to connect our remarks, and render them intelligible to those who wish to follow us in the course of observation.

The pelagian calcareous rock which occupied our attention in the preceding section, and which may correctly be termed a compact limestone, presents to our view scarcely any of those shells and marine productions still existing in the present ocean. They are almost without exception bivalves, among which the terebratulites continually predominate. Coal, petroleum, fluor spar, blende galena, argilla-

aceous iron ore, salt springs, and nitre, with several other materials of minor importance are almost concomitant with this formation, and tend to characterize and distinguish it when it assumes an almost horizontal stratification. It is greatly to the advantage of the miner and the mineralogist, as well as to several branches of public economy, that such geological distinctions could be drawn betwixt the different strata and formations of minerals, as might always prevent the waste of money and labour. Yet, after all, it is to be regretted, that the ambiguity of certain strata is sometimes so great, as to admit of considerable argument in ascertaining their difference; such, in a great measure, is the character of the second calcareous formation which now claims our attention.

In its geographical limits, it occupies a position universally to the east of the primitive and transition formations. Its existence, as far as I know, has not been ascertained to the north of the bay of Chesapeake; it here makes its appearance in the vicinity of Annapolis, and presents several features common to the transmontane stratum. It appears, however, to be destitute of the concomitant minerals, excepting, indeed, it were possible to conceive it in connexion with the coal basins of Richmond, which I have found on examination to be actually underlaid with a calcareous rock of a peculiar appearance. Mr. Heath's coal-mines, and, in fact, nearly all of them, except those which were in a state of combus-

tion, are overlaid by a massive micaceous conglomerate, or grit rock, containing *crystals* of felspar like porphyry, in which, besides gigantic *culmarii*,* occur veins of the argentine calcareous spar of Kirwan, similar to that of Cornwall, resembling silvery talc or steatite, in which are occasionally imbedded minute chrystals of blue and white fluor like those, equally rare, in the gneiss of the Schuylkill, together with common calcareous spar and chrystals of sulphate of lime. In the bituminous slate clay, which, as usual, accompanies this coal, besides impressions of ferns, and the supposed *Equiseta*, there are vestiges of some enormous flaccid leaved gramineous plant, leaves of one of the *Scitamineæ* similar to those of ginger, and fine casts of a palm, resembling the pennate fronds of some species of *Zamia*, or *Cycas*. The apparent remains of fish, which also occur together in such uncommon abundance, are extremely ambiguous, inasmuch as the supposed fins alone, are found. The coal in this formation, instead of that even continuity so obvious in that of the western states, presents very limited beds, which, as they recede or occupy the centre of the basin, vary from 6 or 8, to that of 40 feet in thickness! The coal itself, highly bituminous and brittle, contains abundance of pyrites. What relation the breccias and

* An assumed generic name for an assemblage of extinct Zoophytes? (one species of which, is the *Phytolithus striaticulmis*, of Martyn's *Petrificata Derbiensia*.)

conglomerates of this vicinity have with the testaceous lime-stone, I cannot pretend to say; they do not indeed contain impressions of shells, though fragments of lignite, and silicised wood have been found imbedded in the siliceous conglomerate. On the high road to Richmond, in the exposed declivity of the barren pine-hills, a few miles from the coal-mines, I found fragments of transformed wood, penetrated with *quartz* of an opaque white color, destitute of the resinous fracture, and easily crumbling into an almost impalpable sand. These fragments, however, occurring in beds of disintegrated, and amorphous chrySTALLINE quartz, in which also appears the oldest conglomerate* of cloudy and pale blue quartz, are more probably referable to the ancient beds of the transition. Of the small importance, however, which ought to be attached to the relative antiquity of transition rocks, and particularly to those which are so evidently mechanical in their structure as the conglomerates and sand-stones, we have an almost unexpected example, in the recent discovery of bones imbedded in the *old red* sand-stone of New-Haven, 35 feet below the surface; a circumstance, in itself, sufficiently curious, without introducing the improbable conjecture of the remains being *human*.

* As it regards the strata of the United States, and always occurring from the state of New York to Georgia, imbedded in the mica-slate.

Although, there can remain but little doubt of the continuity of the floetz lime-stone we are endeavouring to trace towards the south, still, in consequence of the more recent alluvial deposits, it is not again discernable until we arrive in North Carolina. Here, Mr. Maclure remarks, that it runs "parallel to, and within the distance of from 20 to 30 miles of the edge of the primitive, through South Carolina, Georgia, and part of the Mississippi territory." That it continues also eastwardly to the borders of the ocean, I have reason to believe, from discovering it in the immediate vicinity of Wilmington, North Carolina, where it appears from beneath the alluvial sand-hills of the town. There, though less compact than the older secondary formation, it alike contains terebratulites, flustras, millepores, caryophylites, gorgonias, as well as more recent shells, such as cardiums, peccinites and ostreas, not very dissimilar to the existing species of the coast. In 1816, while proceeding through North and South Carolina, to the city of Charleston, I remarked the first appearance of this floetz lime-stone in the immediate neighbourhood of Statesburgh, in South Carolina, near the commencement of the hills of Santee. Here we observe a fine-grained slaty and ferruginous sand-stone, containing scales of mica, and rounded nodules of argillaceous iron-ore, bassetting out from beneath a conglomerate made up of *sea-shells* and quartzose pebbles, cemented together with calcareous as well as siliceous matter, the latter of which often appearing in the form

of botryoidal agate. These marigenous beds are nearly horizontal, though here elevated into hills, and appear, as far as I could previously observe from analogy, to be underlaid by a formation of trap and argillite. From hence, to the little town of Manchester, there intervenes a succession of coarse-grained and ferruginous sand-stone hills, washed into deep gullies, presenting a prevalence of red and very sandy clay, indicative of the décomposé trap. Eighty miles from Charleston, along what is called the river-road, on the high and sandy banks of the stream produced by the Drowning Spring, I noticed scattered masses of a stone, consisting in great part of flinty confluent silex, bordering on chalcedony, including seams of broken shells, as well as others which were imbedded and retained their calcareous substance. Some of them were *spiral univalves*, others *cardiums*, and pectinites resembling those of the present sea-coast. In some places this stone appears to pass into a granulated quartz, resembling sand-stone, but of a very fine and drusy grain. This bed appeared to be about twelve inches in thickness, and sensibly compressed; beneath, it passes into a sand-stone, which is again underlaid by a thick bed of light grey schistose and indurated marlite, containing also rounded nodules of the same substance. The Utaw spring is one of those large bodies of clear water which issue at once in considerable streams from the bosom of this stratum. This formation is considerably allied to the siliceous

lime-stone of the environs of Paris, and mill-stones have been made of it, but are found to be softer than those of France. In its seams have also been discovered depositions of hyalite, or the concrétionary hyaline quartz of Haüy.

At Nelson's Ferry, on the south side of the Santee, I again observed an horizontal ledge of the floetz lime-stone, of a whitish color, and fragile consistence, containing amidst innumerable masses of small shells, those of some *Ostrea*, not very dissimilar to existing species, but of a remarkable thickness, and occasionally impressed with the forms of other shells. The copious and clear springs of this formation continue to within ten miles of the city of Charleston, where, with its overlay of ferruginous sand-stone, it forms the foundation of all the other alluvial deposits. Amorphous carbonaceous remains, connected probably with lignite, sparingly appear in this soft sand-stone a few miles from Charleston. In a former route, from Savannah and Augusta, in Georgia, I repeatedly met with this calcareous bed, in which even occurs the *trilobites paradoxus*, and the ovate encrinal fossil, figured by Parkinson and described by Mr. Say in Silliman's Journal, under the name of *Pentremite*, hitherto found only in North America, and in connection probably with this formation.* In some parts of South Carolina, this calcareous rock appears of a friable texture, and

* This curious fossil occurs also, abundantly in the lime-stone of Huntsville, in the Mississippi territory.

passing into marl, or containing so much argillaceous earth as to burn into a very indifferent lime. Its existence has been traced into part of the Mississippi territory,* and again found along the coast of Cape Florida, and the gulf of Mexico, by Mr. Maclure. Along the banks of the Mississippi, and towards the base of the hills of Fort Adams, it again presents its usual characteristics, being of a whitish color, of a soft and friable consistence, like calcareous tufa, and also in connection with an undurated marl. Ascending this river, without discovering its existence decisively in the alluvial hills of Natchez, we, however, perceive its arenitic overlay in the basis of the cliffs known by the name of the Grand and Petit Gulf, where the obstruction of this stratum suddenly checks the meanders of the river, and produces two very powerful and dangerous eddies. The last appearance of this stratum on the banks of the Mississippi, as indicated by sand-stone, is in the bases of what are called the Walnut-hills, but its concomitant marigenous alluvium can be distinctly traced to the ferruginous cliffs, called the Paint-hills, or Mine au Fer, about 15 miles below the confluence of the Ohio; indeed Henderson, or the Red Banks, and the town

* Marine shells, as *Ostreas*, &c. have been found at the "Chickasaw Old Town," 300 miles north-east of Natchez, as well as at the United States agency amongst the Choctaws, 120 miles north north-east of the same place, according to Mr. E. Cornelius, in Silliman's Journal.

of Owensville, commonly called the Yellow banks, the latter about 120 miles below Louisville on the Ohio, still present traces of this extensive deposition, though unaccompanied by the sand-stone and calcareous rock. On the west side of the Mississippi we also discover the same marine alluvial formation in the elevated banks of the Arkansa, on which the town of Arkansas is situated, and which terminates the great prairie, dividing the waters of this and the White rivers. Still more lofty, and better characterized, are also the friable cliffs, called the Pine-bluffs, commencing about 120 miles higher up this river. Proceeding from hence in a southern direction, we again meet with this alluvium on the banks of the Washita, which gives rise to the Bovey-coal or lignite mentioned in the voyage of Dr. Hunter and Mr. Dunbar. In the calcareous platform of Red River, which we found to constitute the basis of its plains, both above and below the confluence of the Kiamesha, we discover a great extent of this formation to the west, and in some degree parallel with the indention of the Mexican Gulf. This limestone presents all the usual characters of friability, whiteness, argillaceous admixture, and more recent shells such as cardiums, pectinites and ostreas, as well as gryphites, terebratulites, and alcyonites. In a few places along the immediate banks of Red River, it is partially overlaid by hillocks of a conglomerate abounding in horn-stone and other siliceous pebbles, cemented principally by ferruginous matter. A more

remarkable aggregation, appears, by a dip, to basset out from beneath this calcareous platform, on the northern banks of the river, near the entrance of the Kiamasha. From its massive appearance, and obscure greenish-grey color, it strongly resembled a trap, or grauwacke; it proved, however to be a calcareous sand-stone, with a crystalline cement, and like the grauwacke, as well as sand, occasionally includes adventitious pebbles, and angular debris, among which we observed the existence of chalcedony.

How far this calcareous formation extends into the neighbouring province of Texas, and under what circumstances, I have not been able to ascertain; but I may further add, concerning its north-western limits, that it appears to be essentially separated from the older secondary calcareous formation, by the interposition of a transition range of mountains, stretching towards the south-west, which separate the tributary streams of the Arkansa from those which flow into Red River; and that from hence to the gulf of Mexico in a south-east direction, traversing the plains of Opelousas and Attakapa and the maritime part of the province of Texas, no other chain of mountains are known to exist. It is not necessary for us to trace the maritime alluvium of the Atlantic states so well defined in the essay of Mr. Maclure, and we shall now merely add some remarks on its character as it appears in the valley of the Mississippi. Along the immediate banks of this river, it is no where intersected on its western border; all the cliffs of reenter-

ing high-land are confined to its eastern bank. The first of these, below the mouth of the Ohio, is the Mine au Fer or Iron-banks; and after a descent of several hundred miles, we again perceive an occurrence of the same bank of friable materials in the four successive bluffs or cliffs of the Chicasaws. As this alluvium is here best developed, we shall attempt to describe its appearance. These cliffs are elevated about 200 or 300 feet above the lower level of the river, and are a portion of the continuous high-lands which constitute the principal part of the territory. They are connected with the uplands of the Walnut-hills, of Natchez, Fort Adams, Grand and Petit Gulf, Ellis's and Thomson's cliffs, and finally terminate a few miles below Baton-rouge. The surface often presents a ferruginous clay or gravel; and from the deep and friable nature of the materials, it is subject in the vicinity of streams to be washed into deep and wide ravines. The soil is but moderately fertile, and requires the aid of manures. The Chicasaw Bluffs, which from top to bottom, as well as at Natchez, present nothing but friable beds immediately below the surface, consist of sandy and ferruginous clays, lower down often purer and whiter; then succeeds, with an almost unexpected uniformity, a band of bright pink-colored clay, which we also recognize at the Mine au Fer, as well as in the Pine-bluffs, about 180 miles up the Arkansa. This clay is succeeded by another bed nearly similar to the first; a carbonaceous appearance then succeeds, and com-

monly a thin bed of lignite; dark, greyish clays still follow, containing pyrites, and argillaceous iron ore, often lying at the base of the cliffs in corroded, flattened, and rounded masses; and at the very lowest level of the river, in low water, a second and much thicker bed of lignite succeeds, exhibiting every gradation from the state of wood, and also containing, amidst more friable materials, indurated sand-stone nodules, resembling those of argillaceous iron-ore, containing impressions of the leaves of existing oaks* as well as those of plants resembling species of *Equisetum*.

We have to ascend the Arkansa 60 miles from its outlet, through the recent alluvium, before we arrive at the commencement of the *primitive* soil. All the inferior space intervening betwixt the Mississippi, and White River, is so subject to inundation as to be rendered totally uninhabitable. How far the supposed ancient marine deposit extends into the Great Prairie, which is about 90 miles in length, I have not been able satisfactorily to ascertain, though from the extent of adventitious gravel over the neighbouring uplands, and the reappearance of its bed in the Pine-bluffs, 120 miles above Arkansas, we have no reason to suppose its termination short of the whole extent of the prairie. Amongst the least equivocal marks of marine origin visible in this deposition, is the discovery

* Such as those of *Quercus phellos* the Willow Oak and *Q. rubra* or *Q. coccinea* the Red Oak.

of shells, which accidentally came to my notice a few miles below the Pine-bluffs, picked up by the children of some of the French hunters resident in this country, and consisting of a species of ostrea, like that of the Santee, penetrated by seams of calcareous crystals, exhibiting marks of a former attachment to a softish ferruginous sand-stone, and containing fragments of lignite. On the same sand-bar was also found a small conch-shell,* which did not appear to have been imbedded.

This massive deposit, in all probability, makes an appearance at Alexandria on Red River, to which place the recent alluvium also extends; and the ferruginous conglomerate resembling that of New Jersey we have found to continue more than 1000 miles up this river. From a consideration of these circumstances, and the direction of the transition chain of mountains, which traverse this territory nearly from north-east to south-west, we are led to suppose the existence of the more recent calcareous platform nearly to the sources of Red River, where it is probably succeeded by the gypseous red clay and salt formation.

The extraordinary breadth of that part of the alluvial valley of the Mississippi, subject to inundation, from the mouth of the Ohio to the ocean, said to be of the extent of from 30 to 40 miles, is easily accounted for, in the friable nature, and the magnitude of the marigenous deposit through which it flows. Its bed

* *Strombus pugilis*.

appears continually to have encroached towards the east; and indeed all the larger rivers, except the Ohio, come in from the west, and possess currents considerably more rapid than that of the Ohio.*

From a point, a few miles below Baton-rouge, where the primitive soil terminates, we are to trace the commencement of the proper delta, or modern alluvial formation of the Mississippi. From hence the river presents no more sinuous meanders; but, without any additional breadth, proceeds towards the ocean in flexuous lines or stretches, disembogues much of its waters by receding channels or bayous, and presents along its banks, which are of an uniform and depressed elevation, a conformity of surface incompatible with the caprice of any formation of independent origin. For several hundreds of miles in succession, to the city of New Orleans, no settlements are practicable beyond the border of the river; the agricultural plots, all defended in front from inundation, by a levee or continued line of embankment, are constantly averaged at a depth of 45 arpens or acres, beyond which universally commences an undrainable swamp. The fertility of these lands is no where exceeded, and without any kind of tillage, promise a perpetual harvest, and never-failing source of wealth to the planter.

* According to the observations of Major Long, the descent of the Ohio is 8 inches per mile, that of the Mississippi 12, that of the Missouri and Arkansa 16, and of the river Platte 18 inches.

We shall now conclude this essay by a few remarks on the transition chain of mountains which traverse the Arkansa territory.

§ III. OBSERVATIONS ON THE TRANSITION MOUNTAINS OF ARKANSA.

The first appearance of this formation, as well as the first rock which attracts our attention in ascending the Arkansa, commences about 200 miles above the village or post of Arkansas. From the unusual appearance, and inconsiderable comparative elevation which the hills here present, the place has received the name of the Little Rock. The strata which are schistose and destitute of organic reliquiæ, dip at an angle of more than 45° to the north-east, and consist of dark-grey, or greenish-grey, argillaceous sand-stone, of a fine grain, and intermingled with mica; it appears to be a grauwacke slate, bordering on argillite, and is traversed by massive veins of quartz containing crystals. It is here alternated with a soft and pale coloured slate clay, which decomposes into something resembling pipe-clay, and which the inhabitants have employed for white-washing the interior of their cabins. As we proceeded westward, those hills at length assumed the elevation of mountains, being schistose towards the base, and arenilitic at the summit. The sand-stone of a coarse grain, lightish grey color, and lesser dip, is likewise destitute of organic remains. At Piatt's settlement, we came in full view of a conic topped mountain, rising not less than one thousand feet above the neighbouring

plain. At first view it appeared to be insulated, but was actually connected with an adjoining ridge of inferior elevation. This mountain, resembling a pyramid, is known to the French and American residents and hunters, by the name of the *Mammelle*. It was distinctly visible from the hills of the Dardenai, a distance of more than 60 miles over land. From the same point of view, we could enumerate three principal ranges of mountains tending towards the south-west.*

In several places the schistose strata are almost vertically elevated, so as to present along the margin of the river, a smooth and even wall, occasionally penetrated with zig-zag seams of quartz. At the Cadron, three hundred miles from Arkansas, the slate exposes to view impressions of something related to the ramified Alcyonites, but *flexuous* and spirally grooved, also concave articulations of a species of Or-

* The mountain, apparently laid down in Pike's map as visible at the distance of three days' journey, is situated about ten miles south of the Illinois bayou, and is a long ridged eminence, known to the French by the name of the Magazin mountain, connected with a chain which proceeds to the sources of the Pottoe, the Petit John, Le Fevre's fork, and the Kiamesha of Red river; from hence, without ever touching Red river, the mountains proceed towards the sources of L'eau Bleu, and the Faux Washita, continuing in a direction towards the head springs of Red river, where they probably coalesce with the primitive range.

thoceratite;* the same schist, at the Galley rocks (the commencement of the Cherokee settlement,) also discloses organic reliquiæ of the same class,† but no bivalve shells. A beautiful hone-slate appears to alternate with the other schistose formations, in the vicinity of the hot springs of the Washita, and is noticed in the journal of Hunter and Dunbar. Its pure whiteness, when recent, is a character quite peculiar; still, by its slaty texture, and inferior hardness, besides the absence of organic reliquiæ, it can by no means be confounded with hornstone, which, in many respects, it resembles.‡ From the neigh-

* This shell appears to belong to the genus *RAPHANISTER* of Montfort's *Conchyliologie Systematique*, vol. I see p. 338, but very distinct from the species there figured.

† One of them with a moniliform flexuous appearance and of the length of six or eight inches, bears some resemblance to the *Ichthyosarcolite* of Desmarest, figured in the *Journal de Physique* for July, 1817, in plate II. figure 9 and 10.

‡ To avoid ambiguity and confusion, it seems to me necessary to designate the "hone-stone" of the Washita by a particular name, as nothing similar to it appears hitherto described. I shall therefore, in reference to its prevailing color, give it the trivial name of *GALACTITE*.

This siliceous mineral, which in many respects resembles Hornstone or Chert, is distinguished by its remarkably even, slaty cleavage both in the large masses and minute fragments; its cross fracture is largely conchoidal, and destitute of lustre; fragments, about a line in thickness, are strongly translucent. Its hardness is such, when pure, as readily to give fire with

houring mountains of the hot springs, which originate in this formation, I have seen specimens of magnetic iron-ore, like that of the Hudson and New Jersey. On the road to the springs, also, I have obtained specimens of a dark grey amphibolic rock, strongly magnetic when heated, of a very close grain,

steel. Its color, very similar to that of Cacholong or porcelain, is milk-white, acquiring a faint ferruginous tinge by exposure to the weather, it then more readily cleaves, and becomes somewhat absorbent. Its specific gravity is 2,60. Before the blow-pipe it is perfectly infusible, and unlike chalcedony and flint still retains its translucence. With potash it dissolves into a white enamel, but does not form glass. Analyzed in the manner described by Klaproth, which it is not here necessary to repeat, it afforded in the hundred parts, silice 86, alumine 1,50, lime 2, oxid of iron 5, and volatile matter with a trace of carbonic acid 4.

Geological situation and locality.] It is found in the transition mountains of the Washita, a few miles from the hot-springs, and in the Mazern mountains, at the sources of the Kiamasha of Red river, forming schistose beds, which alternate with slate-clay and grauwacke-slate. Passing apparently into a translucent hornstone, still retaining the slaty cleavage, and often breaking into rhombic fragments, similar to felspar. This mineral is the "hone-stone," spoken of by Hunter and Dunbar, but sufficiently distinct from Novaculite, although when weathered or deteriorated by foreign admixture, it becomes in some degree, suitable for that purpose. Its cleavage appears to be produced by the iron, which it essentially contains, and its milky color is probably derived from the carbonate of lime.

and containing imbedded prismatic chrystals of brown mica. Slate of various kinds, occasionally alternating with a peculiar novaculite bordering on hornstone, and dipping at an angle of not less than 45° constitutes the principal part of this formation, and is overtopped as in the Alleghanys, by elevated ridges of sand-stone.*

* In this chain of mountains, which continues north-eastward towards the sources of the St. Francis, two miles north of the village of St. Michael, at the lead-mine of La Motte, Mr. Schoolcraft observed, what he calls a *vein* of granitic rock, of a red color, and containing very little mica, he asserts it to be four or five miles wide, and traced its continuance for twenty or thirty miles; as he adds, at the same time, that it is used for mill-stones, I can scarcely doubt for a moment, its identity with the transition conglomerate which Mr. Bradbury and myself examined, in 1810, employed for the same purpose, a few miles from St. Louis. What the green-stone porphyry may really be, I cannot pretend to say, though it may very possibly exist in that quarter. Mr. Bradbury visited the spot and obtained specimens of the micaceous iron-ore, which is said to form a mountain mass near to Bellevue (Washington county.) These united facts, tend to prove the continuation of the transition chain of mountains beyond the valley of the Mississippi, but they ought not to be confounded with the chrystalline granitic formation of the sea-coast and the northern Andes.

A Notice concerning the Spider, whose webb is used in medicine. By N. M. HENTZ.

It has been found lately, that the webb of a species of spider, common in the cellars of this country, possesses very narcotic powers, and it has been administered apparently with success in some cases of fevers.

Having for some time past, studied with care, the genus *Aranea* of Linneus, I have been induced to write a description of this species; I therefore made a drawing taken from a large female, which accompanies the present notice.

The genus *Aranea* of the first writers on Entomology being composed of a very great number of species, it has been found necessary to divide it into smaller sections, or families. Gmelins' edition of Linneus contains ninety-eight species; Walckenaer enumerates nearly three hundred, and the number may be carried to a thousand. If the colour of the abdomen were the only character to find the species among several hundreds, it would be a very difficult task to assign with certainty a name to each separately, without any other description. Messrs. Latreille and Walckenaer have rendered the history of this genus quite easy to study: they have left little undone in regard to the species known to them. It is to be regretted that Mr. Walckenaer's *Tableau des Araneides* is not a more common work.

I shall therefore give the generic characters of

this spider, as if the work was unknown to the naturalists in this country.

It belongs to the genus *Tegeneria* of Walckenaer, and to that of spiders, properly so called, of Latreille. Its characters are : eight eyes, forming two parallel lines, the upper being curved and longer. Lip wider in the middle, cut straight at its extremity. Maxillæ inserted upright, not bent on the lip. Corselet nearly as large as the abdomen. The first pair of legs the longest, the fourth next, then the second, and the third the shortest. MANNERS, spiders forming an horizontal web, with a cylindrical tube, in the form of a funnel.

This is sufficient to characterise the genus, containing the different species of spiders, which inhabit cellars and dark places. The species that makes its web in the fields, on bushes, does not belong to the same genus; it has been properly separated from it by Walckenaer. The last pair of legs is the longest in this, and the eyes differ essentially in their situation. There is another species, very common in Carolina, which, however, I have not yet observed here, making a web nearly similar to this, but very different in all its generic characters; it ought not to be taken for the other : I intend publishing a description of the genus *Aranea*, in which this will form a separate section. But the characters which I have given are sufficient to ascertain whether a spider belongs to the genus *Tegeneria*, so that with some attention, no mistake will occur.

The species which I am treating of, is of a black colour, inclining to blue; the abdomen is marked with about ten livid pale spots, and a line towards its anterior extremity: I have seen specimens where the legs were marked with black spots. I think it necessary to remark here, that spiders of the same species living in dark places, vary greatly in their colours, according to the manner in which the light strikes upon them. The great point in this case I think, is to ascertain the genus, for it appears that the web of all species belonging to it, has the same virtues, and this is distinct from the *Aranea Domestica*, whose web has been used in Europe: we see an illustration of this in the genus *meloe*, where every species possess more or less the blistering power.

The present American spider, I think, has not been as yet described: for the present I shall call it *Tegeneria Medicinalis*.—Pl. V. fig. 4.

a—organs of manducation.

b—position of the eyes.

Description of some new crystalline forms of the minerals of the United States. By Dr. G. TROOST. —Read March 6, 1821.

As yet but little attention has been paid to the crystalline forms of the minerals of this country, many of which have no analogies with those described by European crystallographers. Among this number may be mentioned a variety of phosphate of lime, with the description of which, I have now the honor to present the Academy, and hope to continue the

research by the examination of some others in my possession.

1. PHOSPHATE OF LIME (*unitaire.*) Plate V. Fig. 3.

The representative signs of these crystals with the indications of the principle angles, are,

$M \overset{1}{B} P$

$M x P$

Inclination of M upon P 90°

M upon M 120°

x upon P $140^\circ 47'$

x upon M $129^\circ 13'$

The faces x being formed by the decrement of a single range of molecules, I have termed it Phosphate of lime (*unitaire*) according to the nomenclature of Mr. Haüy.

2. PHOSPHATE OF LIME (*unitaire compressed.*)

The crystals are sometimes so much flattened or compressed, as to put on the appearance of an eight sided table with bevelled edges. In this case the two opposite faces of the prism M offer square surfaces at the same time that the faces $P P$, and four of the faces of the hexaedral prism are linear.

Besides these two varieties there occurs in the same matrix, crystals of the primitive form, varying from one-tenth of an inch to an inch; as well as in rounded pieces. Indeed nearly all the crystals present some of their edges rounded, and particularly the margins of the summits, so that they often have the appearance of hexaedral prisms terminated by rounded summits.

The phosphate of lime is slowly soluble in nitric acid; and occasions no phosphorescence when its powder is thrown on burning coals.

It is found at St. Anthony's nose, near New York, in magnetic pyrites of a grey, sometimes bronze yellow color. This ore is partly in a state of decomposition, having then the appearance of the brown oxide of iron, the crystals which occur in this part of the gangue have their edges generally blunted, which is not the case with those found in the unaltered pyrites; this would induce the belief that these crystals have been partly dissolved by the sulphuric acid formed by the decomposition of the pyrites. The crystals found in that part have always a ferruginous color, while those in the undecomposed part of the ore, are of a blackish green color. This mineral, besides phosphate of lime, contains lamellar hornblende of a dark green, when in the undecomposed ore, and of a ferruginous color in the decomposed parts.

ZIRCON.

Some well determined crystals of zircon occur on the York road, near Philadelphia, exhibiting modifications of the present known forms, which I shall endeavour to describe.

ZIRCON, (*primitive form.*) Plate V. fig. 4.

$\overset{1}{D} \overset{1}{E} \overset{2}{E} P$

Zircon pyramidal

$\overset{1}{l} s x P$ fig. 5.

D

The inclination of the different faces are

$$\begin{array}{ll} l \text{ upon } s & 135^\circ \\ x & e \ 142^\circ \ 55' \\ x & P \ 150^\circ \ 5' \end{array}$$

This variety which is one-fourth of an inch in length, is in the possession of Mr. John P. Wetherill, who found it in the place above-mentioned. The prism is composed of eight hexagonal faces terminated by pyramids of eight faces, the summits being replaced by four rhomboidal ones corresponding with the faces of the primitive octahedron.

$$\begin{array}{l} \text{Zircon (bisunitaire)} \quad \begin{array}{c} \overset{1}{D} \ \overset{2}{D} \ E^1 \ E^2 \ P \\ \overset{1}{l} \ u \ s \ x \ P \end{array} \quad \text{pl. V. fig 6.} \end{array}$$

The inclination of these faces are

$$\begin{array}{ll} l \text{ upon } u & 159^\circ \ 17' \\ u & P \ 152^\circ \ 8' \\ x & l \ 142^\circ \ 55' \\ x & P \ 150^\circ \ 5' \\ l & s \ 135^\circ \end{array}$$

This variety was found by Mr. Benjamin Say. The faces *u* are sometimes so much extended as to make the faces of the pyramid almost entirely disappear.

The gangue, in which these crystals are found, is a granite composed of partly decomposed feldspar, sometimes of a greenish color, and quartz, containing besides the zircon particles of magnetic iron ore.

An account of the ARACHNIDES of the United States.

By THOMAS SAY.

The following descriptions of the *Arachnides* of this country, which respire by means of trachea in the manner of insects, may be regarded as the continuation of a series of essays, of which the "account of the Crustacea," &c. is the first, on the vast orders of *articulated animals with articulated feet*, (*Annulosa* of Cuvier) natives of this country. As the nature of the journal precludes the introduction of old matter or known facts, I shall confine myself in its pages, to the description of such of these animals only, as appear to be unknown to naturalists, or to the elucidation of such, as from their obscurity, are not understood.

SUBCLASS I. CEPHALOSTOMATA.

ORDER 1st, PODOSOMATA.

GENUS *ANAPHIA.†

Pl. 5. fig. 7.—*a* Trophi.

Artificial Character.—Mandibles longer than the rostrum, first joint longer than the second; palpi none; nails single.

Natural Character.—*Body* very slender, composed of four segments bearing feet, and a small sub-oval caudal process; *head* prominent, not perceptibly contracted behind, and consisting of a prolongation of the anterior segment of the body; *eyes* four,

† From *a*, without, and *αφι*, *tactus* the touch.

inserted on a common tubercle, upon the top of the head; *mandibles* robust, didactyle, inserted at the extremity of the head, pored, parallel, two-jointed, longer than the rostrum, first joint elongated attaining the tip of the rostrum; *hand* abruptly inflected upon the tip of the rostrum; *rostrum* pored, cylindrical, truncated at tip, shorter than the body, and inserted beneath the first segment; *palpi* none; *feet* eight, filiform elongated, slender; *coxæ* three-jointed, the middle one longest; *thighs* one-jointed; *tibiæ* two-jointed; *tarsi* two-jointed, the first very short; *nails* single, arcuated, capable of being inflected.

SPECIES.—A. **pallida*. *Body* whitish; *ocular tubercle* acute at tip; *eyes* sanguineous; *hands* suboval, slightly hairy, not dilated, inflected vertically, and with the fingers, hardly more than two-thirds the length of the preceding joint; *fingers* arcuated, crossing each other near the tip; a small, rather acute tubercle at the base of the anterior feet (probably the rudiment of the egg-bearing organ;) *coxæ* second joint clavate; *tibiæ* first joint rather shorter than the second.

Length of the body 1-4 of an inch.

Span of the feet 1 1-2 inch.

Inhabits the coast of South Carolina.

Cabinet of the Academy.

Of this new genus I found two specimens in the bay of Charleston, S. C. upon the branches of the *Gorgonia virgulata*, and as they have not the egg-bearing organs, I suppose them to be males. This

animal resembles *Phoxichilus* in being destitute of palpi, but differs from it in having didactyle mandibles and simple nails. In the form of the mandibles it resembles *Nymphon* and *Ammothœa* but the want of palpi distinguishes it from those genera, its proper situation is probably next to the genus *Phoxichilus*. It, unquestionably, is generically the same with *Phalangium aculeatum* of Montague, (Trans. Lin. Soc. vol. 9, tab. 5,) which Dr. Leach, in the article *Crustaceology* of Brewster's Encyclopædia, refers to the genus *Nymphon*, but which, as far as I can discover, he has omitted in his subsequent works. It will of course be a second species of this new genus.

ORDER II. POLYMEROSOMATA.

FAMILY 2. SCORPIONIDEÆ.

Genus BUTHUS. Leach. *Scorpio*, Latr.

Palpi brachiform, didactyle ; eyes eight ; abdomen terminated by a caudal process of six articulations, of which the terminal one is armed with a venomous aculeus.

SPECIES.—B. **vittatus*. Fuscous, with three fulvous vitta ; sides black.

Inhabits Georgia and Florida.

Cabinet of the Academy.

Body above granulated, granules irregular, distant, three fulvous equal vitta, and an elevated, interrupted vertebral line ; *sides* black, rugose, *beneath* white ; *thorax* reddish brown, more scabrous before and be-

hind, hardly marked by the vitta, subemarginate before, and divided by a longitudinal impressed line, region of the dorsal eyes blackish; *palpi* longer than the body, with granulated lines, carpus with three or four of the granules more conspicuous; *hand* subovate, greatest diameter about equal to that of the preceding joint; *fingers* filiform, incurved, longer than the hand, reddish-brown, furnished with numerous minute teeth; *feet* paler than the palpi, minutely granulated above and beneath; *caudal process* colour of the palpi, longer than the body, with granulated costa, those of the penultimate segment not more conspicuous; *terminal segment* subovate, slightly mucronate beneath the aculeus, the costal granulae minute.

Length from tip of the palpi to tip of the caudal process, 1 inch and 7-10ths.

I found numerous specimens of this species on the sea islands of Georgia and in East Florida, hyberating beneath the bark of trees.

The wound inflicted by the puncture of their aculeus, causes much pain and intumescence, but is readily cured by the topical application of the volatile alkali.

The species to which *vittatus* is allied, are the *punctatus* of Degeer and *Americanus* of Linné, but according to Latrielle (v. Sonninis' Buffon) these are both spotted with brown, the caudal process of *punctatus* being of the length of the body and that of *Americanus* three times the length of the body.

It is, however, very possible that our species may be a variety of *punctatus*.

Genus CHELIFER. Geoff, Leach.

Palpi brachiform, didactyle ; thorax with the first segment divided by a transverse indented line ; eyes two ; mandibles short.

SPECIES.—1. C. **muricatus*. Third joint of the palpi nearly three times as long as the second, linear, gradually a little attenuated to the base ; thorax muricated.

Inhabits North America.

Cabinet of the Academy.

Body ovate, narrowed before, rounded behind ; *thorax* black-brown opaque, gradually narrowed from the base to the tip of the mandibles, armed with numerous short, robust spines ; *feet* rufo-testaceous ; *palpi* rufous, basal joints subglobular, gibbous behind, third joint cylindrical, nearly three times longer than the second, armed with short rigid hairs, and gradually attenuated to the base, fourth joint shorter but somewhat larger than the preceding one, and gradually much attenuated to its base ; *hand* black-brown, above oblong-subovate, laterally linear, *fingers* as long as the hand, paler, incurved and furnished with a few elongated, flexible hairs ; *abdomen* above black-brown, and with the feet furnished with minute, spinelike hairs, segments margined with obsolete pale testaceous.

Length rather more than 1-10th of an inch.

Common in decaying wood, under bark, in houses, under stones, &c. I found a variety on the river St. John, in East Florida, of which the anterior portion of the abdomen and posterior part of the thorax is rufous. This species considerably resembles *C. Hermannii* of Leach, (Zool. Misc. vol. 3, p. 49.)

2. *C. *oblongus*. Second joint of the anterior feet hardly twice as long as the first, rather larger towards the base; thorax polished.

Inhabits North America.

Cabinet of the Academy.

Body oblong, sublinear; *thorax* reddish-brown, polished, testaceous at base, rather abruptly attenuated from the middle to the tip, and with abbreviated flexible hairs, instead of spinules; *feet* pale, testaceous; *palpi* reddish-brown, with dilated, short joints, and furnished with numerous flexible hairs, second and third joints subequal, the latter rather shorter and dilated in the middle; *hands* ovate, almost truncated at base; *fingers* shorter than the hand, and with a few longer hairs; *abdomen* above brownish, slightly hairy, polished, margins of the incisures testaceous. Smaller than the last.

Occupies the same situations as the preceding. It bears considerable resemblance, in the form of the palpi, to the *C. Geoffroyi* of Leach, (Zool. Misc. p. 50.) This species, as well as the preceding, are readily distinguishable from the *Phalangium acaroides* of Linne, by the mutic antepenultimate segment of the palpi.

March 1821.

ORDER 3. DUOMEROSOMATA.

FAMILY 2. PHALANGIDEÆ.

GENUS PHALANGIUM.

Body rounded; feet elongated; tarsi with numerous joints; mandibles salient much shorter than the body; eyes two, supported on a common tubercle.

SPECIES. 1 P. **vittatum*. Whitish, with a dorsal fuscous vitta; terminal joint of the palpi not pectinated with spines.

Inhabits the Southern States.

Cabinet of the Academy.

Body whitish, truncated and fuscous behind, a dorsal fuscous vitta from the clypeus to the cloaca and lateral fuscous line, above with dense, obtuse granules, beneath with distant ones; three profoundly impressed lines before the middle, of which the anterior one is semicircular including the ocular tubercle, the intermediate one transverse, and the posterior one recurved; *ocular tubercle* prominent, slightly contracted at base, crowned with from four to six more conspicuous, acute spines; *clypeus* not elevated, concave beneath the obtuse tip; *feet*, second pair about fifteen times as long as the body; *tarsi* capillary, articulations not contracted.

Length, female nearly one-fifth of an inch. Male much smaller.

The armature of the ocular tubercle is obsolete in the male, and in this sex there are generally two

whitish lines, drawn from the base of the ocular tubercle to the tip of the clypeus, which are also sometimes visible in the female.

I have not found these in coitu, but have considered them of the same species, from their being associated and somewhat similar in form and markings.

2. *P. *dorsatum*. Whitish, with a dorsal fuscous vitta, joints of the palpi armed with a series of spines.

Inhabits the United States.

Cabinet of the Academy.

Body rounded behind, whitish, a dorsal fuscous vitta continued from the clypeus to the cloaca, and obsoletely punctured with whitish, a few submarginal, obsolete, irregular lines or spots; granules dense, obtuse, not prominent; *ocular peduncle* prominent, contracted at base, slightly muricated before, obsoletely granulated; *clypeus* not elevated; *palpi* rather long, robust; second, third, and fourth joints pectinated on the exterior edge with acute, distant spines; fifth joint more densely pectinated on the inner edge; *feet* armed with minute distant spines; *coxæ* blackish; *pectus* with distant very distinct, obtuse granules; radical supports of the feet with a moniliform line each side in the incisures; *venter* nearly glabrous, granules indistinct; *tergum* not deflected.

Length of the female one-fifth of an inch.

Very similar in colour to the preceding, but sufficiently distinct by the spinulose palpi, &c.

3. *P. *nigrum*. Body ovate, blackish; clypeus

prominent; radical joint of the three anterior pairs of feet armed with a spine; pectus and base of the feet white.

Inhabits the Southern States.

Cabinet of the Academy.

Body ovate, a little dilated each side behind the posterior feet, blackish, with a few obsolete paler spots, above and beneath; above granulated, granules spherical, irregularly placed in somewhat reticulated lines; *ocular tubercle* destitute of spines, with obtuse granules; *clypeus* prominent, somewhat elevated; *feet* short, fuscous, whitish at base; second pair hardly four times as long as the body, and, with the first pair, armed with a prominent, cylindric, obtuse spine behind the basal joint; third pair with a similar spine before; *pectus* whitish; *venter* blackish.

Length, female nearly one-fifth of an inch.

A very distinct species, and not uncommon in the Carolina's and Georgia.

4. P. **grandis*. *Body* oval, covered with short spines; *ocular tubercle* spinous; *feet* rather short.

Inhabits the Southern States.

Cabinet of the Academy.

Body oblong-oval, scabrous, with approximated, robust, short, acute, spinules; rufo-ferugineous, two impressed transverse lines before the middle; *ocular tubercle* prominent, slightly contracted at base, crowned with numerous, robust, acute spinules; *clypeus* hardly elevated; *feet* rather short; *pectus* with numerous, minute, acute granules; *venter* with but few.

Length, female nearly seven-twentieths of an inch.
Much the largest species I have seen.

GENUS GONYLEPTES. Kirby.

Feet moderate; tarsi from six to ten jointed; mandibles chelate; maxillæ none; palpi unguiculated.

SPECIES. *G. *ornatum*. Ocular tubercle hardly elevated, unarmed; hind feet remote; two erect spines behind.

Inhabits Georgia and Florida.

Cabinet of the Academy.

Body ovate reddish-ferruginous, destitute of granules, edge slightly contracted over the insertion of the fourth and fifth pairs of feet, two small acute tubercles on the middle of the disk, and two large, prominent, erect, acute spines on the hind margin, no impressed line before the middle, an anterior arcuated yellow transverse line connected to a posterior undulated one by a yellow line which is crossed near the middle by two obsolete yellow bands; *ocular tubercle* slightly raised, unarmed; distance between the eyes much greater than their diameters, orbits black; *clypeus* abruptly somewhat acute in the middle of the tip; *mandibles* rather small, the fingers subequal, and crossing each other at tip; *palpi* robust, and when at rest concealing the mandibles; penultimate articulation dilated on the exterior side and elongated and depressed; terminal joint half as long as the preceding, cylindrical; terminal nail elongated, moveable, capable of being inflected;

feet short, not three times as long as the body, three anterior pairs before the middle, posterior ones behind the middle and remote from the others ; fourth and fifth pairs with double nails ; *abdomen*, segments with a series of equidistant, minute tubercles.

Length, one-fifth of an inch.

This remarkably distinct species, we first discovered on Cumberland Island, Georgia, and subsequently many specimens occurred in East Florida, where it appears to be common. It is not an inhabitant of the Northern States.

FAMILY 3. ARANEIDEÆ.

Although I have a considerable number of descriptions of Araneides, which I think are new, yet, as I am not sufficiently well acquainted with the species of this family, in their different ages, prudential motives induce me to refrain from publishing them until further investigation shall qualify me for the task.

ORDER 4. MONOMEROSOMATA.

GENUS TROMBIDIUM.

Body consisting of a thorax and head united and distinct from the abdomen ; two anterior pairs of feet distant from the others ; eyes pedunculated, lateral ; palpi with a moveable appendice beneath their tips.

SPECIES. 1. *T. *scabrum*. *Body* ovate, broadest and very obtusely rounded before, pale reddish, minutely scabrous, surface unequal, with numerous in-

dentations, and with hardly perceptible hairs; *thorax* obtriangular, short; *eyes* white; *feet* whitish.

Cabinet of the Academy.

In forests, on trees, &c. not uncommon.

2. T. **sericeum*. *Body* oblong-subovate, broadest before, narrowing behind, densely covered with short, silken hair; *thorax* elongated, sublinear, slightly contracted before the middle, and with a darker, central line above; *eyes* white, placed in a transverse line; *feet* paler, whitish.

Cabinet of the Academy.

Inhabits trees, in forests, under stones, &c. and is more common than the preceding.

GENUS ERYTHRÆUS. Latr.

Body without division, the two anterior pairs of feet not distant from the others; eyes two, sessile; palpi conic, chelate.

SPECIES. E. **mamillatus*. *Body* ovate, granulated, reddish-yellow, with a marginal impressed line, edge thickened, a robust, obtusely conic, granulated spine on the anterior lateral edge, before the middle of the disk two indented punctures, a few distant hairs; *eyes* approximated, whitish; *mandibles* granulated, a rounded tubercle on each of the middle above; *feet* paler than the body, yellowish, with scattered hairs.

Less than one-twentieth of an inch.

Under bark of trees, &c. Georgia and East Florida.

GENUS GAMASUS. Latr.

Mouth with mandibles ; palpi prominent, very distinct, filiform ; *pulvilli* at the apex of the tarsi.

SPECIES. 1. G. **antennæpes*. Body ovate, rufous, somewhat narrowed before, hairy and coriaceous ; edge of the abdomen membranaceous, white ; feet, anterior pair filiform, antennæform, longer than the body, remaining pairs much more robust, subequal, posterior thighs tridentate near the inferior tip ; origin of the palpi with five or six acute spines above.

Cabinet of the Academy.

I have frequently observed this species, inhabiting, in considerable numbers, the body of *Passalus cornutus*. The fore feet are, as their slender appearance indicates, used as antennæ to feel the way, and not as feet to support the body.

2. G. **spinipes*. Body suboval, hirsute, rufous ; feet with rather longer distant hairs, second pair very robust, third joint armed beneath with a large, prominent, acute spine, which is nearly as long as the transverse diameter of the joint, compressed, slightly serrated on its anterior edge, and with an accessory tooth or two at its base, fourth joint with an obtuse tooth beneath, sixth joint with a robust spine before its inferior middle, first and third pairs unarmed, fourth pair dentate beneath the third and fourth joints.

Cabinet of the Academy.

Inhabits —————.

Remarkable by the prominent spine of the second pair of feet.

3. G. **musculus*. *Body* pale, oval, with scattered hairs more numerous each side; *feet* paler, with a few hairs above, two anterior pairs distant from the others, anterior pair longest, second pair rather more robust.

An active little animal, found in great numbers on an anonymous species of *Mus*, which inhabits East Florida.

4. G. **nidularius*. *Body* oblong-oval, somewhat depressed, with a slightly elevated margin, and with scattered hairs, whitish with internal blackish clouds, and two impressed points in the middle of the back; *feet* paler with a few hairs.

Cabinet of the Academy.

Less than one-fortieth of an inch.

Inhabits *Hirundo viridis* their nests and young. I am indebted for specimens to Mr. Reynall Coates.

5. G. **Juloides*. *Body* oval, pale brownish, depressed, behind vesicular and whitish, the coriaceous epidermis of the tergum terminating before the vesicular posterior margin in an emargination; *feet* short and very robust; *pulvilli* dilated, very short.

Cabinet of the Academy.

I obtained several specimens from the body of *Julus marginatus*. I have also observed it on *Polydesmus Virginiensis*.

GENUS ORIBITA. Lat.

Body coriaceous, capitate or rostrated before, palpi and mandibles concealed within the mouth; feet terminated generally by three nails, without pulvillus.

SPECIES.—1. O. **concentrica*. Black, opaque; tergum concentrically lineated; venter plain.

Inhabits Pennsylvania.

Cabinet of the Academy.

Body spheroidal, black, opaque, rounded before and carinated behind, invested with a brown epidermis; disk with about four elevated concentric circles, connected by numerous interstitial elevated lines; posterior carina crenate in compliance with the concentric lines; *head* subtriangular, rugose; *oral aperture* oval, closed by a valvular mentum; *eyes* two, minute, brownish, elevated on an elongated, slender filiform peduncle; *orbits* elevated, rather large, placed near the base of the head above; *feet* rather short, deep black, minutely granulated, terminated by three incurved nails; *venter* plain, granulated, valves of the cloaca somewhat lineated.

A rather common insect, it moves very slowly, and inhabits beneath the bark of trees. I have found it, most frequently, beneath the bark of the common *Carya* (Nuttall) *tomentosa*.

2. O. **glabrata*. Body glabrous, polished, globular-oval black.

Inhabits Georgia and East Florida.

Cabinet of the Academy.

Body spheroidal, somewhat oval, glabrous, polished, black; *head* longitudinally semi-oval; *eyes* sessile, near the base of the head each side, remote; *feet* hairy, pale testaceous, subequal, shorter than the body.

I found this species several times under stones, &c. It is sluggish in its movements, like other species of this genus; when alarmed or in danger the feet are thrown forward together over the mouth, and the whole of the thorax is then deflected upon the anterior part of the body; in this state the general form is a solid oval.

GENUS BDELLA. Latr.

Palpi elongated, terminated by setæ; rostrum conic; eyes four; posterior feet longest.

SPECIES.—*B. *oblonga*. *Body* oblong-oval, bright red, paler in the middle and beneath, with a few scattered hairs; *rostrum* nearly half as long as the body, with two or three pairs of stouter hairs; *palpi* four jointed, resembling arms; first joint destitute of hairs and longer than the others conjunctly; second and third joints very short; fourth joint longer than the two preceding ones, attenuated towards the base and truncated at tip, with several short hairs and two terminal setæ longer than itself, of which the inner one is rather shorter; *feet* hairy, subequal, pale, the posterior ones rather longer.

Length rather more than one-twentieth of an inch.

Found in Georgia, under stones, under bark of decaying, trees, &c. in rather moist situations.

GENUS IXODES. *Latr.*

Palpi short, simple, valvular, forming with the haustellum a short rostrum; mandibles none; feet with a pedunculated pulvillus and two nails; eyes obsolete or wanting.

SPECIES—1. *I. *annulatus*. *Body* oval, pale reddish-brown, tinged with sanguineous, particularly behind, and with several longitudinal and oblique, black, abbreviated lines, scattered punctures, and three abbreviated, longitudinal impressed lines behind; *rostrum*, with the *palpi* dilated, rather suddenly contracted at base, and annulated more prominently beneath with about two elevated lines, which on the sides produce an angulated appearance, much shorter than the haustellum, rounded at tip; *haustellum*, the two superior organs emarginate at tip, exterior division dentate beneath, inferior organ with numerous resupinate teeth resembling fenestrate punctures; posterior to the origin of the palpi above is an orbicular, obscure assemblage of punctures resembling eyes; black dorsal lines of the male somewhat regular, consisting usually of a dorsal line divaricating before, and behind, the middle, furnishing a branch each side, which at the tip of the abdomen

is confluent with a lateral line, which also branches off in two or three short lines towards the feet; *feet* with a short robust nail, and a reclivate pedunculated pulvillus and nails.

Found in considerable numbers on a *Cervus Virginianus*, in East Florida.

2. I. **orbiculatus*. *Body* nearly orbicular, slightly narrower before, punctured, ten or twelve longitudinal, abbreviated, impressed lines on the posterior margin, marginal impressed line none, two longitudinal indented lines before the middle; *head* transverse subquadrate, posterior edge very obtusely rounded, the posterior angles complying with the general curve; *palpi* oblong, sublinear.

Cabinet of the Academy.

Found inhabiting *Sciurus capistratus* of the Southern States.

3. I. **crenatus*. *Body* ovate, with distant deeply impressed punctures, posterior margin lobated by ten or twelve profoundly indented lines, which are abbreviated by an impressed submarginal line, which becomes gradually obsolete before the lateral middle; posterior edge crenulated; *thorax* none, distinct; *head*, posterior edge transversely rectilinear, angles slightly arquated backward and rounded at tip; *palpi* oblong, sublinear and regularly rounded at tip.

Cabinet of the Academy.

Found in the Southern States, the colour is red-

dish, sometimes slightly varied with whitish, particularly behind, and the lobate divisions of the posterior margin are sometimes whitish above, and the disk is obsoletely lineated with black.

4. I. **eraticus*. *Body* oblong-ovate gradually narrowed before, sides hardly arquated, with distant punctures, those behind more deeply impressed, posterior margin with ten or twelve impressed lines which are abbreviated by a submarginal impressed line, two abbreviated lines before; *head*, posterior edge transversely rectilinear, angles extended backward abruptly, and subacute; *rostrum* rather short; *palpi* oval-orbicular.

Found in the Southern States; the colour is reddish or ferruginous, with acute black lines.

5. I. **variabilis*. *Body* oblong-ovate, gradually attenuated before; sides hardly arquated; a few remote deeply impressed punctures not more numerous behind; posterior margin with about twelve impressed, abbreviated lines; a lateral, impressed, punctured, submarginal line, obsolete behind; two deeply indented, abbreviated lines before; *head*, hind edge rectilinear, angles abruptly a little extended backward, acute; *rostrum* rather short; *palpi* ovate; *colour* reddish or ferruginous varied with white, incisures of the feet white.

Very much resembles the preceding in form; the white of the back is more or less reticulated, and the

ARACHNIDES OF THE

feet are white above, or only their joints. May not this be *I. lineatus*, if so, my name must of course be rejected.

6. *I. *punctulatus*. *Body* oblong-ovate, gradually attenuated before, sides hardly aruated, crowded with impressed confluent punctures; *thorax* destitute of punctures, but with two impressed undulated lines; abbreviated lines of the posterior margin not deeply impressed, almost obsolete; lateral submarginal line deeply impressed, obsolete behind; *head*, hind edge rectilinear, angles abruptly a little projected backward, acute; *rostrum* rather short; *palpi* oval; *eyes* distinct, impressed; *colour* ferruginous, *thorax* white lineated or varied with ferruginous; incisures of the feet white.

Considerably like the preceding.

7. *I. *scapularis*. *Body* red, with a few short whitish hairs; *thorax* blackish-red, well defined, with numerous punctures; *tergum*, punctures sparse, and four or five blackish, obsolete, dilated radii on the disk; a deeply indented submarginal line; no abbreviated marginal lines behind; edge rounded; *head* beneath and above blackish, posterior edge rectilinear, angles abruptly projected backward, very short, acute; *eyes* distinct, deeply impressed; *rostrum* slightly canaliculate above, paler than the head; *feet* blackish-red, ciliate beneath, terminal joint reclivate near the tip on the anterior edge; ori-

gin of the anterior ones, armed behind with a large acute spine.

Rather common in forests, and frequently found attached to different animals.

8. I. **fuscous*. *Body* fuscous, ovate, punctured; *tergum* with a few black, obsolete lines, and a profoundly indented submarginal line, posterior marginal impressed line none; no distinct thorax; edge rounded; *head*, posterior edge rectilinear, angles not prominent beyond the rectilinear edge; *eyes* not visible; *palpi* suboval, terminal joint rather longer than the preceding one.

Cabinet of the Academy.

A common species.

GENUS HYDRACHNA. *Mull. Latr.*

Rostrum advanced, conic; mandibles none; palpi projecting, terminated by a moveable appendage; body subglobular; feet natatory.

SPECIES.—II. **triangularis*. *Body* white; *eyes* two, sanguineous; *tergum* with a black triangular spot near the eyes, posterior portion black, with a white dorsal line terminating in the cloaca.

The specimen, from which this portion of a description was taken, I found in *Unio cariosus*, in which, possibly, it had adventitiously effected a lodgement.

GENUS LIMNOCHARES. Latr.

Rostrum hardly prominent ; palpi incurved, simple ; mandibles none ; feet natatory.

SPECIES.—L. **extendens*. Body ovate, red, minutely lineated ; *tergum* with a few indented points ; *beneath*, origin of the feet paler red ; *feet*, second and third pairs ciliate with very fine and long hairs, posterior pair destitute of cilia.

Length nearly three-twentieths of an inch.

A common species, inhabiting stagnant pools, &c. in forests, and shady places. The posterior feet being destitute of cilia, are only useful in walking ; when the animal is swimming, they are extended behind, without distinct motion. The eggs are globular, surrounded by a white gluten, and are deposited on almost any object indifferently, from two hundred to three hundred in number, arranged somewhat symmetrically in parallel, rectilinear, or undulated series. I have found them about the middle of May.

GENUS LEPTUS. Latr.

Feet six ; trophi forming a capitate body ; palpi conic, quadriarticulate ; an obtuse tube, subconic, advanced ; body soft.

SPECIES.—1. L. **araneii*. Body oval, red, with short, distant hairs ; head whitish, somewhat rounded,

contracted at basè and acute at tip ; *palpi* white, a little hairy, rather surpassing the tip of the head ; *tergum* with a deeper red eye on each side over the interval between the anterior and second pairs of feet, anteriorly indented, and with two lines each of four or five indented points.

Length one-thirtieth of an inch.

Cabinet of the Academy.

Of this species, I have found a specimen adhering near the base of the *palpi* of an *Aranea*

The head-like process, is sometimes retracted so as to be not prominent, but is not long withheld in this position. The body is somewhat contractile, not perceptibly as regard its length, but in its breadth, by an irregularly undulated motion of the edge.

2. L. **hispidus*. *Body* suboval ; *head* with a distinct neck ; *palpi* more robust at base ; *feet* elongated, much longer than the body, filiform and furnished with numerous robust, incumbent, flexible setæ, about twice the diameter of the leg in length.

My Cabinet.

I took no less than ten of these animals from a *Phalangium*, to which they adhered very strongly ; when feeding, they often are supported only by the rostrum and *palpi*, the body and feet being elevated so as to be sometimes perpendicular to the supporting surface.

GENUS OCYPETE. *Leach.*

Feet six ; mouth rostrated, porrected, with mandibles ; palpi elongate-conic, with a moveable appendage at base ; body soft ; eyes two.

SPECIES.—*C. *comata.* *Body* subtriangular, very obtusely rounded behind, hirsute, and narrowed by an arquated line to the rostrum ; *rostrum* short, narrowed and emarginated at tip ; posterior feet longer than the body, and with much longer hairs than those of the body.

Inhabits several species of *Tipula*.

This is readily distinguishable from the *O. rubra* *Leach*, by the elongated hairs of the feet. The specimens in my possession, are so disposed that the trophi cannot be examined, I therefore refer them to this genus by analogy, drawn from habit, &c.

Analysis of the Blue Iron Earth of New Jersey, made at the School of Mines at Paris, in the year 1819, by LARDNER VANUXEM.—Read, March 13th, 1821.

This is the same mineral that was examined by Judge Cooper, and an account of which was published by him in the first volume, (second series) of the Transactions of the Philosophical Society of Philadelphia. He considered it to be an Hydrate of the

Protoxide of Iron. The means which the Judge used were insufficient to shew the existence of Phosphoric acid, which is one of its essential constituents. For a description of this mineral the reader is referred to the above work, and to the mineralogy of Professor Cleaveland.

This mineral was analysed as an hydrated protophosphate of Iron, a preliminary examination having shewn that it contained no other substances.

A. 5 *Grammes* of the mineral were dissolved in nitro-muriatic acid with heat. Water was then added to dilute the liquor, and the iron was thrown down by ammonia, in union with the phosphoric acid; the precipitate separated from the liquor by filtering was washed and calcined: the resulting liquor was set by for future examination.

B. In order to decompose the ferruginous phosphate, it was treated with three times its weight of caustic potash, at a red heat, in a silver crucible, the mixture was constantly stirred and maintained at that temperature for half an hour; after cooling, it was diluted with water and filtered. As one fusion does not always free the oxide of iron from phosphoric acid, it was again fused with another portion of that alkali, again diluted and filtered. The oxide of iron was well washed with water acidulated with acetic acid, to separate it from the potash, then dried and calcined. It weighed 2.42 *grammes*. As the iron in

this mineral is in the minimum state of oxidation, the difference being eight per cent. the real quantity contained in it will be 2.227 *grammes* of Protoxide.

C. To the liquor, from which the oxide of iron had been separated, nitric acid in excess was added, and boiled to expel the carbonic acid that might have united with the potash during its fusion, &c. Ammonia was then added in excess which gave a slight precipitate having the appearance of alumine. It weighed, after calcination, 0.02 *gramme*

D. The above liquor by the addition of muriate of lime gave an abundant precipitate of phosphate of lime which separated as usual by filtering and being calcined weighed 2.60 *grammes*.

E. Supposing that the ammonia in the liquor A had decomposed a part of the phosphate of iron, it was examined as in C and D; thus treated it gave 0.21 *gramme* of phosphate of lime, making together 2.81 *grammes*; as this salt is composed of 54 parts of base, and 46 parts of acid, the quantity of phosphoric acid will be 1.2926 *grammes*.

F. To ascertain the quantity of water contained in this mineral, 5 *Grammes* were dissolved in nitric acid evaporated to dryness, and calcined to expel all the nitric acid. This was repeated a second time, to be certain that all the protoxide of iron was converted

into peroxide. It weighed 3.78 grammes: as no other volatile matter exists in the blue iron earth but water, the quantity of it ought to equal this loss, (1.22 grammes) and the difference between the protoxide of the mineral and the tritoxide obtained by the analysis, which is 0.193 gramme; together 1.413 grammes.

Hence we have for result,

	grammes or per ct.	
Protoxide of Iron . .	2.2270	44.54
Phosphoric Acid . .	1.2926	25.85
Water	1.4130	28.26
Alumine	0.0200	0.40
Loss	0.0474	0.95
	5.0000	100.00

To show that the precipitate obtained with the muriate of lime, really contained an acid with a base of phosphorus, it was dissolved in nitric acid, then decomposed by oxalate of ammonia, which threw down the lime; this product was removed by filtering, the liquor was evaporated to dryness, then calcined at a red heat in a platina crucible; nothing remained but a vitreous matter, slightly soluble in water, of an acid taste, and reddening litmus paper; it resembled *glacial Phosphoric acid*. This acid, exposed to a red heat with charcoal in a coated glass tube, gave Phosphorus; hence, no doubt can exist as to this mineral being a phosphate of iron.

Lately this mineral has been re-examined, with

the assistance of Judge Cooper, in the laboratory of the College of South Carolina, in Columbia, with the same results.

Descriptions of several new species of Cuttle-fish.
Read March 20, 1821. By C. A. LESUEUR.

Having observed many species of the class *Cephalopoda*, and being desirous to arrange them agreeably to the new systematic distribution of this class, which Dr. Leach has published, (in the *Journal de Physique* for May, 1818,) I experienced much difficulty in disposing of one of my species. This species corresponds with those of his first order *Octopoda*, by having eight arms, similar to those of the *Eledona*, &c. and with those of his second order, by the form of the body, and the position of the fin, being similar to those of the species of the Genus *Loligo*. With these characters it ought to form an intermediate section, between these two orders.

Dr. Leach has appropriated the name of *Octopoda* to those animals of this class, that have eight arms, and a body destitute of a fin; and the name of *Decapoda* to such as are furnished with ten arms, and with fins which margin the body (or sac) entirely, or partially.

The latter, constituting his second order, are in part referred to a family which he names *Sepiidea* and which is composed of the Genera *Sepia* and

Loligo of Lam, and he places the latter after the *Sepia*.

But the characters which he assigns to this family, do not appear to me to harmonize with those of the genus *Sepia* of Lamark, of which the body is oval, short, sub-obtuse, furnished with fins throughout its whole length; sustained by a very distinct, thick, sub-obtuse bone, which is sometimes armed with a spine posteriorly, is hard and solid towards the back, tender and cellular beneath, and is "*composed of calcareous, very thin, parallel lamina, connected together by thousands of very small, hollow columns, which are perpendicular to their surfaces*, (Cuv. Regne Animal.) Are not these last characters sufficient to distinguish and to separate entirely the genus *Sepia* from that of *Loligo*? inasmuch as this latter genus, on the contrary, has a body enclosed in a sheath, which is long, cylindrical, subulate, narrow, with the fins terminal, united or separate; a very thin, feeble bone, which is often narrow, transparent, sometimes partially gelatinous; this bone or cartillage, which belongs also to the *Sepiola*, appears to me to present a character which ought to approximate the *Loligos* to the *Sepiola*, as Mr. Cuvier has done, (Regne Animal, t. 2, p. 364,) and which will not admit of the interposition of the genus *Sepia*, as in the arrangement of Dr. Leach.

It may then be proper to establish a distinct family for the reception of the genus *Sepia*, to be distinguished by the name given to it by Dr. Leach, of

Sepiidea, with the characters which Mr. Cuvier has assigned to the genus (Regne Animal, p. 365.) For there is good reason to believe, that when the species of the Mediterranean and the other seas, shall be more critically examined, that many species will be discovered, that will require new divisions to be made in this family, as well as in the present genus *Loligo*.

It may also be proper to consider the *Loligos* as forming a separate family. It is of little consequence what characters we select for the distribution of these animals into families and genera, if our arrangement is the most convenient, and exhibits, as near as possible, a gradual transition from one to the other.

The order in which Mr. Cuvier arranged them is very natural, he places the Polypus of Aristotle, the *Eledona*, the *Loligo* and the *Sepia* in succession; and the new genus which I shall propose in this essay, may be readily intercalated in the series.

If we observe the form of the body; that of the fins, and their position; the form and the number of the arms; the disposition, the number, and the form of the suckers, their corneous circles either entire or divided, their detentations; the arms which have these suckers regularly or irregularly armed; in fine, those which have nails, either naked or covered by a membrane, upon the longer arms; and those which have nails and suckers; together with the form of the bone; we shall then have characters sufficient for the formation of new divisions.

A careful examination of all the species which exist in the cabinets, and which, from the general form of the body, are regarded as the same, would prove that many distinct kinds have been associated under one specific denomination.

Thus I regarded the species described in this paper, from the collection of the academy, and that from the Philadelphia Museum, as specifically the same, with one of which I made a drawing at Sandy-bay ; but upon comparing them with each^a other, they all proved distinct.

In the following arrangement I have considered the form of the body, the number of the arms and their armature. To the family I apply the name of *Loligoidea*, of which the genera may be divided into those which have not long arms ; and those which have long arms, and finally, those which have simple nails ; those which have nails and suckers ; and those which have suckers only.

FAMILY LOLIGOIDEA.

CHARACTERS.—Body enclosed in a sac, which is elongated, narrow, cylindrical, subulate posteriorly ; fins terminal, united or separate ; bone very thin, more or less transparent, sometimes partially gelatinous ; arms as in the *Sepia*, with or without long arms.

* Arms sub-equal.

GENUS 1st, LEACHIA.

Eight unequal arms, the third pair longer and more robust.

L. **cyclura*. Terminal fin orbicular; head small; eyes large, prominent; body coniform.

Inhabits the Pacific Ocean.

Total length from the extremity of the tentacula to the tip of the fin five and a half inches; body three inches; tail one inch; the long tentacula one inch and a half. The first pair of tentacula very short, second pair longer, third pair still longer and more robust; inferior pair nearly equal to the superior ones; terminal fin orbicular, slightly embracing the tip of the body; *color*, tentacula and superior portion of the head light blue; *body* and *tail* tinged with bluish and red, irrorate with red points, ornamented with several irregular spots of a deeper red, and with remote, transverse, black, abbreviated lines, two large light brown, suboval, dorsal spots behind the middle, preceded by a black spot, and with a red one posteriorly.

This description is taken from a drawing made by Mr. Petit, from a specimen obtained in the Pacific Ocean, in lat. 37° South, and long. 33° East.

** Having long arms, furnished with suckers.

GENUS 2nd, LOLIGO, *Pliny. Lam.*

Fins, united, pointed at the base.

SPECIES.—1. L. **Bartramii*. Arms sub-compressed, with a large membrane at their inner angles.

The *sac* in this species is very firm, cylindric to the base of the fin, where it contracts, and terminates

in a point; *fins* united, entire, forming the third part of a circle, of which the center is the extremity of the tail, they are superposed, terminated each side by an angle, thick upon the posterior side, very thin and pellucid on the anterior; *head* cylindric, truncated behind, so as to enable it to close the sac; *neck* on each side furnished with three small, rounded, compressed appendices, placed longitudinally; *eyes* free in their orbit, of which the aperture is small, with an anterior lacrymal emargination; no membrane annexed to the orbit for covering the eye. Ten arms, furnished with suckers, which, on the extremity of the long arms, are disposed in four series, with the larger ones central; the other eight arms have but two series, which extend from the base to the extremity. These eight arms are unequal, the first pair smallest; second pair longer than the first; third longer than the second, much compressed, and furnished with a large membrane interiorly and towards the anterior extremity; the fourth and inferior pair, as long as the second, the suckers oblique, elevated on the exterior, and depressed on the interior side, armed with a corneous, denticulated circle, the peduncles of the suckers repose upon the base of the transverse vermiform muscle, with which the interior lateral membrane is furnished; the two long arms feeble, slightly compressed, dilated at their extremity, which is margined on each side by an undulated membrane, and towards the superior extremity opposite to the suckers by another membrane; *beak* concealed and co-

vered by a folded sphincter, which is furnished with six very short appendices, hardly surpassing the folded membrane of the mouth; *bone* very narrow, corneous, feeble, transparent, enlarged a little anteriorly, gradually diminishing, cylindrical, and terminated by a small hollow cone posteriorly, margined each side by two strong lines, in the middle by a single line; *color* violet-blue, passing into purpleish on the back, head and tail; a narrow, longitudinal, yellowish band on each side of the back; sides of a pale blue; beneath white; brown points disseminated over all the body, but more numerous above.

2. L. **Pealeii*. This species, which appertains to the fine collection of the Philadelphia Museum, was politely confided to my care, for examination, by the manager of that interesting and superb establishment Mr. R. Peale. It appears to me, not referible to any of the species figured by Seba, nor of those published by Montfort.

The sac is solid, firm, cylindrical, gradually attenuated to a point, and furnished with a flat appendice anteriorly; *fin* terminal, more than half as long as the body, united in a point posteriorly, lateral angles rounded, lateral and posterior sides thickened, anterior side thin, surface with transverse striæ, formed by small muscles; *head* small, compressed, with a small transverse membrane each side below the eyes; *neck* small, short; *eyes* covered by a mem-

brane; *arms* eight, of which six are subtriangular, the two superior ones a little shorter than the second pair, which are equal to the inferior pair, third pair very strong, rounded, and depressed, longer than the others, furnished with a membrane at their exterior part; all the arms furnished with two series of suckers, which are hemispherical, alternate and pedunculated; the *disks* are obliquely truncated, most elevated on the exterior side, beneath indented for the attachment of the conic peduncle, they are armed with six horny brown teeth above, of which two superior ones are narrow and pointed, and the four others broader; inferiorly and upon the narrow side of the disk is a long, horny, brown lamina; the *two long arms*, are subcylindric, dilated at their extremity, margined on each side by an undulated membrane, upon which the peduncles of the suckers repose; four series of suckers, of which the middle series are largest, and terminated at each extremity by smaller suckers; *disks* hemispheric, transversely truncated, armed with a corneous circle, and having strong remote teeth, with two or three smaller intervening ones, in the central disks; but I have not been able to determine the number of intermediate teeth in the lateral disks; besides the thin lateral membrane, there is another thicker one, placed obliquely upon the enlarged extremity of the long arms; the opening of the mouth, has three concentric folds, the exterior one of which is furnished with a much folded membrane, which is terminated

by six small appendices, or false arms, furnished with several suckers at their extremities, the two inferior appendices shorter.

The *bone* is broad, naviculiform, terminated in a point at each extremity, thin at the margin, carinated, and a little more robust at the anterior extremity, which is narrowest.

The superior part of the head, of the tentacula and of the back covered with reddish-brown points, which are less numerous upon the sides and abdomen.

Coast of South Carolina ?

When Mr. Maclure and myself were at Sandy Bay in 1816, we saw a great number of *Loligos* collected by the fishermen, and held in reserve as bait for Cod-fish, which they catch in great numbers on the banks of Newfoundland. The beautiful color with which they were ornamented, induced me to take a drawing of one immediately, but not then having leisure to complete it, I took a specimen with me to finish the drawing at my leisure. But recently upon comparing this specimen with my drawing, I was much surprized to perceive that I had brought with me a very distinct species from that which I had observed. I mention this circumstance to explain the cause of the brevity of the following description, taken from my drawing.

3. *LOLIGO *illecebrosa*. The body of this species is rather short, narrow, subequal anteriorly, terminated acutely posteriorly; *fins* approximated at their origin, terminated in a point, and taken together rhombiform; the two longer arms are narrow, dilated at their extremity, and furnished with two series of suckers, the eight arms are almost equal and provided throughout their whole length with two ranges of suckers; the arms are long, and with the head they measure two-thirds of the length of the sac; the bone is very narrow in the middle, dilated at each extremity, and terminated at the inferiority by a hollow inverted cone.

Colors vivid and beautiful, passing from a brilliant red to a deep and clear blue, upon the back, the head, arms, tail, and fin, which are covered with deeper points of the same color, the under part of the body is paler, region of the eyes finely tinted with yellow.

This species is known by the name of *Squid* at Sandy Bay, and is made use of by the fishermen as bait in the Cod-fishery.

4 *LOLIGO *Bartlingii*. Lateral arms compressed, and with the inferior pair, furnished with a membrane upon all their exterior length.

This species for which we are indebted to captain Bartling, who obtained it in the Gulf Stream, forms part of the collection of the Academy. It differs from the preceding by its arms, which are generally longer, filiform at the extremity; a broad, thin and

softer fin is situated at the superior part of the tail; its body also is larger. The bone presents a still greater difference, in being very much compressed at the base, and a little dilated at the opposite extremity.

Color, deep blackish brown; the four superior arms being very much compressed, have their interior surface very narrow and destitute of a lateral membrane; the suckers are very small and crowded, and seem to form but a single range, though in reality they are disposed in two series and are alternate; the eight arms are furnished with suckers throughout all their length, and are unequal, the inferior ones being longest, and the others diminishing gradually. The *long arms*, the extremities of which had been cut off by the fishermen, appear to have been very long; *suckers* hemispheric, placed upon a short peduncle; corneous ring, broad and mutic; the *body* is inserted very deep in the sac, which renders it very free at the superior part; *eyes* free in their orbit, which is dilated, rounded, destitute of nictitating membrane, and furnished with a lachrymal emargination anteriorly; body, back and tail covered with reddish brown points; a slightly depressed line on the superior part of the sac.

5. L. **Pavo*. Sac much elongated, rounded; eyes very large; arms very short, depressed; fin cordate, terminated in a point; bone very narrow anteriorly, somewhat dilated posteriorly, and subgelatinous.

October 1821.

This species is remarkable by its elongated, pointed, and very soft sac; by its bone, which is sub-equal in its greater length anteriorly, and enlarged towards the base, where it is terminated in an obtuse point. The fins are united and oblong-cordate, entire at base, and spreading from the sac, which is narrow, smooth, and, as well as the head and arms, covered on every part with very large ocellations, which are connected together by smaller intermediate ones. General colour, deep carmine-brown; head small; eyes large, prominent, and directed more forward than laterally; neck narrow, short; arms very short, furnished with two series of suckers, supported by narrow pedicles, which are fixed upon the margin at the base of the membrane and towards the narrowest side of the sucker, which is truncated very obliquely, the larger side being exterior, and the narrower interior; they are also distant from each other; the arms are destitute of lateral interior membranes; the large arms are thin.

I have not been able to ascertain whether this species is armed with hooks or suckers. The tips of the small arms, as well as the greater portion of the larger arms, had been cut off by the fishermen; an operation which they perform upon all they capture, for fear of receiving injury from them.

Length of the sac 10 inches. The figure represents the animal half its natural size; it was a female, the oviduct of which was exerted and pendant, as represented in the plate; it is an aggregation of small,

white globules, attached and sustained by a membrane.

Sandy-Bay, 1816.

*** Having long arms, furnished with nails, with or without suckers.

GENUS 3d. *ONYKIA.

O. **Carribæa*.—Arms eight, unequal; tentacula two, elongated, and armed near their extremity with suckers, and with corneous hooks, concealed, each in a membranous sac; fin truncated.

Inhabits, amongst fuci, in the Gulf of Mexico, and in the Gulf Stream.

Head rounded, short, crowned by eight arms and two tentacula; eyes large, lateral. and but little prominent, pupils black, iris blue; body enclosed in a sack, cylindric anteriorly, conic posteriorly, and terminated at this extremity by a sub-triangular fin, of which the inferior angle is truncated and rounded; the space between the origins of the wing which forms this fin is 2 lines long; their extent from one angle to the other, is 8 lines, their length is 6 lines; the diameter of the sack anteriorly 6 lines.

The eight arms are, in all their length, each furnished with two series of suckers; the two superior arms are the shortest, being only 10 lines in length; the six others are 9 lines long; the tentaculæ are one inch and an half long, and are armed at their extremity with two series of incurved hooks, which alternate with suckers at their bases; the series of suck-

ers extend further towards the head, than those of the hooks. These curved horny nails are each covered by a membrane when at rest, which resembles a small pocket. The inferior arms are furnished with a small longitudinal natatory membrane upon their exterior side, and at their base; the lateral arms have also a membrane towards their extremity and above. Colour, as usual in the species of this family, varying from a blue to a purple, or yellow, &c.

Total length from the extremity of the tentaculæ to the tip of the fin, 3 inches.

Head 5 lines; tentaculæ 1 inch and an half; body 1 inch.

OBSERVATIONS.—I have had for some time in my possession, a drawing of a *Loligo*, which was obtained during a voyage from the Canary Islands to the Isle of France, in latitude $36^{\circ} 40'$ south, and longitude 29° east. This drawing, which was executed by Mr. Petit, is very finely coloured; but as it is not sufficiently detailed, it was regarded as inadequate to establish the certainty of the existence of the species which it represented. All doubts, however, are now dissipated by our observations upon the species of the Gulf Stream, and by those recently published by Dr. Leach upon a species of the coast of Africa. Although Mr. Petit's drawing is not calculated to exhibit minute characteristics, yet the following differential traits are remarkable. The hooks are but slightly curved, and destitute of suckers at their base, the fin is rhomboidal, prolonged to a point at the

extremity. To this species I have applied the name of *O. Angulatus*. It has eight unequal tentacula, the two superior ones shortest. Total length from the extremity of the tentaculæ to the tip of the fin, 10 inches; body 5 inches; head very small, 8 lines long; the two superior tentacula 1 inch and 9 lines; the long tentacula 5 inches.

SEPIOLA cardioptera. Peron.

Peron has left no description of this species, which we saw in latitude 31° south, and longitude 48° east; the species appeared to belong to the genus *Sepiola*, and perhaps even to the unguiculated ones. The habit of living in many seas, amongst the fucus which floats upon the surface of the waters, is similar to that of the Gulf Stream, which is furnished with horny nails upon the long arms, as described above.

OBSERVATIONS.—I subjoin the names of the species that Peron and myself observed in New Holland, in order to note their existence. I have sent descriptions of them to France.

Peron designated them by the following names:

1. *SEPIA sepiola*. Peron. Very small.

Inhabits the coast of Endrach, in New Holland.

As this species does not appear to be the *sepiola* of Lin. I propose for it the name of *minima*, as it is very small.

Family of SEPIEDEA. Leach.

2. *SEPIA octopa*. Peron. Very small.

Inhabits the island of Dorre, Shark Bay.

This species can hardly be the *octopus* of Lin. I propose, therefore, the name of *Peronii* for it.

3. *SEPIA rugosa*. Bosc.—I do not think that our species is the same with that described by Bosc; I therefore propose for it the name of that naturalist, *Bosci*.

4. *SEPIA varietas*. Peron.

Inhabits the small island of Dorre.

The shores of King's island were covered with *Sepiæ*, many of which were living. We there observed also many groups of their eggs.

REFERENCE TO THE PLATES.

Plate 6. *LEACHIA CYCLURA*.

Plate 7. *LOLIGO BARTRAMIL*.

fig. 1. lateral view.

" 2. dorsal view.

" *a. b.* sections of the arms magnified, exhibiting front and lateral views of the suckers.

" *c.* a portion of the skin of the body magnified.

" *d.* beak.

" *e.* bone.

" *f.* transverse section of the bone.

Plate 8. *LOLIGO PEALEII*.

fig. 1. dorsal view.

" 2. side view.

" *a.* bone—front view.

" *b.* bone—side view.

" *c.* beak, sphincter, and appendices.

" *d. d. d.* suckers, magnified

Plate 9. fig. 1. *ONYKIA CARRIBÆA*, dorsal view.

" 2. do. do. lateral view.

" *a. b.* bone—profile, and front views.

" *c.* transverse section of the bone.

" *d.* extremity of one of the long arms magnified.

" *e.* hook and sucker, magnified.

" 3. *ONYKIA ANGULATUS*.

Descriptions of the Myriapodæ of the United States.

By THOMAS SAY. Read November 21st, 1820.

CLASS MYRIAPODA.

ORDER 1. CHILOGNATHA.

GENUS JULUS.

Body serpentiform, cylindrical; antennæ inserted on the anterior margin of the head, second joint longest, terminal one minute; eyes distinct; feet many.

SPECIES. 1. *J. *impressus*. Brown, a series of lateral black dots, beneath yellowish white; ultimate segment mucronate.

My Cabinet.

Body cylindrical, immarginate, above brownish, beneath yellowish-white appearing glabrous; segments each with a lateral black spot, whitish lines and dots sometimes obsolete, a transverse series of longitudinal abbreviated obsolete impressed lines, and beneath the stigmata with impressed, more distinct ones, ultimate segment mucronate, spiracles not prominent; eyes rather large, conspicuous, black; labrum yellowish white; antennæ brownish.

A common species inhabiting under stones, and in humid situations, a variety occurs with a very distinct, acute, longitudinal, dorsal line, and variegated head,

2. *J. *punctatus*. *Body* brownish, with an impressed dorsal line, impressed white dots and spots, ultimate segment unarmed.

My Cabinet.

Body cylindrical, immarginate, above dark brown, glabrous, an obsolete, dorsal, whitish, slightly impressed, acute line; *segments* each with a white dot on either side above, and a larger transversely oblong lateral one, which is gradually more completely bisected on the posterior segments into two distinct dots, which on the terminal segments resemble the dorsal ones, ultimate one abruptly narrower than the preceding and truncated, anterior segments attenuated to the head, which is wider than the anterior one, anterior segment as long as the second and third ones conjunctly; spiracles somewhat prominent; *eyes* very distinctly granulated, subtriangular, black; *head* dark-brown, labrum white.

Inhabits the same situations, and is similar in general form to the preceding species, but is less common and rather smaller. The dots, spots and lines are for the most part slightly impressed.

3. J. **annulatus*. Body with numerous, elevated, obtuse lines, of which four are above the stigmata; ultimate segment glabrous, unarmed.

Inhabits the southern States.

My Cabinet.

Body cylindrical, immarginate, above brownish with a slight tint of red, immaculate, beneath yellowish white; *segments* each with about fifteen elevated obtuse lines, of which four are equal dorsal, a pyri-form, larger, oblique one on the stigmata, and about ten decreasing in size to the feet, anterior segment

as long as the three succeeding ones conjunctly and glabrous, posterior one glabrous reddish brown, as long as the two preceding ones, united and obtusely rounded at tip; *head* whitish before; *antennæ* white; *eyes* transverse linear, black; *vertex* not distinctly impressed.

A rather common species in the southern states, inhabiting with the preceding and in decaying wood.

4. J. **lactarius*. Body fuscous with a rufous dorsal line, numerous elevated lines, of which about fifteen are above the stigmata, ultimate segment unarmed.

My Cabinet.

Body cylindrical, above fuscous, with a dorsal rufous vitta and an obsolete one each side; beneath yellowish white; *segments* each with numerous, elevated, longitudinal lines, of which about fourteen are above the stigmata and about fourteen below, becoming smaller to the origin of the feet, line of the stigmata geminate, anterior segment as long as the second and third conjunctly, and glabrous on the anterior half, posterior segment not so long as the two preceding ones united, widely rounded at tip; *head* glabrous; *antennæ* reddish-brown; *eyes* triangular, granulated, deep black.

Not uncommon under stones &c. and when irritated discharges a lacteous globule from the lateral portion of each segment, diffusing a strong and disagreeable odour.

5. J. **marginatus*. Body cylindric glabrous, blackish, segments with a rufous margin; ultimate segment unarmed.

My Cabinet.

Body cylindric, glabrous, polished, blackish, beneath pale reddish; *segments* margined behind with rufous, anterior segment as long as the three succeeding ones conjunctly and entirely margined with rufous, second segment slightly, and obtusely angulated at the lateral tip of the anterior one, ultimate segment as long as the two preceding ones united narrowed to the tip which is rounded; *head* with an impressed line which is obsolete on the front; *labrum* pale, deeply and widely emarginated at the tip, with a submarginal, infracted series of ten or twelve punctures furnishing hairs, tip ciliated, reddish, obsoletely dentate.

Length more than three inches.

A very large species inhabiting decaying wood, &c. when irritated it diffuses an odor like that of muriatic acid, and is infested by *Gamasus Juloides*. It varies in colour; the margin of the segments and all beneath are sometimes white, the ultimate segment is sometimes almost acutely angled at tip, and there is a distinct lateral series of black dots.

6. J. **pusillus*. Body with a lateral series of black spots, terminal segment unarmed.

Inhabits the middle States.

My Cabinet.

Body cylindrical, immarginate, above pale, obsoletely reticulate, and varied with reddish; a lateral series of large black spots, numerous longitudinal, parallel, impressed, acute lines beneath the stigmata becoming gradually shorter to the origin of the feet; beneath whitish; *head* white beneath the antennæ; *antennæ* two joints preceding the last somewhat dilated, not attenuated at their bases, nor separated by a contraction; *eyes* black, longitudinally sublunate; *ultimate segment* unarmed, longer than the penultimate one, rounded at tip and blackish.

Length nearly half an inch.

Resembles *J. impressus* in the character of lateral impressed lines, but is distinct by the unarmed terminal segment; I found it rather common on the Eastern shore of Virginia under the bark of *Pinus variabilis*.

GENUS POLYDESMUS, Latr.

Body elongated, linear depressed, segments with a prominent margin; eyes obsolete; feet many; antennæ, second joint shorter than the third.

SPECIES. 1. *P. *serratus*. Segments with a double transverse series of slightly raised squamiform elevations.

My Cabinet.

Segments depressed above, with four minute serratures each side, first segment transversely oblong oval, somewhat angulated on each side behind, second, third and fourth segments with but three serratures,

first rather longer than the second, and with a single obsolete serrature near the posterior angle, each segment with a double transverse series of twelve slightly elevated, squamiform divisions, anterior segment with but a single series; *head* glabrous, an impressed longitudinal line on the vertex; *antennæ*, *feet* and *terminal segment* hairy; *colour*, above reddish-brown, beneath yellowish white.

Common in similar situations with the preceding.

Julus Virginiensis of Drury, is also rather common, it appears to be synonymous with *J. tridentata* of authors. I have found specimens double the usual size, in the southern States. It seems also to vary in having only the second joint of the feet mucronate, and in being destitute of the robust ventral spines between the feet.

2. P. **granulatus*. Segments granulated, granules subequal, arranged in four series.

My Cabinet.

Body with short hair, pale tinged with red beneath, and feet paler; *head* dusky with short dense hairs; *labrum* whitish; *segments* somewhat convex, granulated, granules rounded, or longitudinally oblong-oval, elevated, obtuse, approximate and arranged transversely in about four nearly regular series, anterior segment transversely oval, narrower than the head or second segment; *stigmata* elevated.

Found in Pennsylvania.

GENUS POLLYXENUS, LATR.

Body membranaceous, pennicillate with setæ at tip; antennæ inserted under the anterior margin of the head.

SPECIES. P. **fasciculatus*. Body pale brown, linear, incisures ciliated, fasciculated each side; head deeply ciliated before.

Inhabits the Southern States.

Segments smooth, ciliate at the incisures and fasciculate with brown setæ each side, terminal pencil cinereous; *head* semiorbicular, depressed, deeply and densely ciliated on the edge with setæ; *eyes* small, oval, prominent, placed obliquely in the middle of the lateral margin; *antennæ* very short, thick reddish-brown; feet white.

Length rather more than one tenth of an inch.

Beneath stones &c. in humid situations, not very common.

ORDER 2. SYNGNATHA.

GENUS LITHOBIUS, Leach.

Antennæ conico-setaceous; dorsal scuta alternately much shorter and concealed.

SPECIES. L. **spinipes*. Joints of the feet with short spines at tip, and a single much longer one beneath the tips.

My Cabinet.

Body chesnut brown, polished, impunctate, with short sparse hairs; *segments* with reflected lateral edges, first one shortest, transverse, the second quadrate with rounded angles, five or six posterior ones each narrowed behind and emarginate on the hind edge, the posterior angles of those near the caudal segment more acute, caudal segment truncate conico-cylindric; *antennæ* pale testaceous, with dense, very short, rigid hair, terminal joint as long as the two preceding ones conjunctly; *feet* pale testaceous, joints spinous at tip, an elongated spine at the tip of each beneath, anterior pair shortest, posterior longest and more robust; *labium* longitudinally indented, impunctate, teeth of the tip black.

Length, more than one inch.

Very common under stones &c. The specimen from which this description was taken has but thirty joints to the antennæ.

GENUS CERMATIA.

C. coleoptrata, Villiers. Is an inhabitant of the Southern States; we observed it both in Georgia and East Florida. It is probable, that, like a vast number of the insects now common in our country, it has been introduced by our shipping from abroad.

GENUS SCOLOPENDRA.

Antennæ conico-setaceous; dorsal scuta subequal; eyes, four each side, hemispherical.

SPECIES. 1. *S. *marginata*. Body obscure olivaceous green; segments margined with dark green; ~~head~~ head castaneous.

Inhabits the Southern States.

My Cabinet.

Body obscure olivaceous green, beneath whitish or fulvous; *segments* impunctured, margined each side and behind with black-green, first, third, and fourth shortest, five or six terminal ones more distinctly margined; *head* chesnut colour; *antennæ* green; *feet* pale, tipped with blueish green, nails blackish; *posterior feet* hardly longer than the three terminal segments of the body conjunctly; length of the joints hardly equal to double their breadth; first joint spinous beneath and within, and armed with an acute, strong, projecting angle at the tip.

Length more than two and an half inches.

Rather common in Georgia and East Florida; it is also found in the West Indies, but does not occur so far north as Pennsylvania.

2. *S. *viridis*. Body blueish green; base of the feet and all beneath, whitish.

Inhabits Georgia and East Florida.

My Cabinet.

Body above blueish green immaculate; posterior segments margined with pale yellowish; *mandibles* yellowish-white; *feet* whitish at base, terminal joints pale blueish-green, posterior pair pale yellow.

Length, about two inches and an half.

I have not known this species to inhabit so far north as Pennsylvania.

GENUS CRYPTOPS. *Leach.*

Anterior edge of the labium not denticulated, hardly emarginate; eyes obsolete; posterior pair of feet longest, basal joint unarmed.

SPECIES. 1. *C. *hyalina*. Body much depressed, white, with a double blackish internal line; hind feet, with the third joint five toothed.

Inhabits Georgia and East Florida.

My Cabinet.

Head reddish-brown polished, impunctured, with scattered hairs, no impressed clypeal line; *antennæ* reddish-brown hirsute, joints sessile, cylindric, terminal ones rounded; *body* white, polished, two black internal lines, a few sparse hairs, impunctured; *feet* with a few hairs; *posterior feet* reddish-brown, first joint not so long as double its breadth, and, with the second joint, armed with numerous short rigid setæ, with an indented line above, third joint four or five toothed within, fourth joint about two toothed.

Length three-fifths of an inch.

Numerous specimens of this species occurred beneath the bark of a decaying Live Oak (*Q. virens*) on the river St. John, East Florida. The appearance of the posterior feet approximates it to *Scolopen-*

dra; but the eyes exclude it from that genus, as the number of feet does from *Lithobius*.

2. *C. *sexspinosa*. First joint of the posterior feet two spined.

My Cabinet.

Body reddish-ferruginous, punctured; second segment shortest, then the fourth and sixth, terminal one indented at tip, and armed beneath with a double, prominent, robust spine; *antennæ* with very short dense hair, joints oval, separated by a very short peduncle; *feet*, two moveable short spines at the exterior tip of the fourth joint, fifth joint with one beyond the middle and one at tip; *posterior feet*, the base beneath a conspicuous, elevated, compressed, acute, sub-triangular spine, and a smaller one on the inner side above, nearer the middle.

Not uncommon in decaying wood. It varies in being impunctured beneath. I have a fortuitous variety, of which the *antennæ* are clavate and five-jointed.

3. *C. *postica*. Terminal segment of the body longest; posterior feet very short and robust.

Inhabits Georgia and East Florida.

My Cabinet.

Body rufous, paler beneath, punctured; segments with two impressed, longitudinal lines above, and a deeply impressed one beneath; ultimate segment longer than the two preceding ones conjunctly, with two

obsolete impressed abbreviated lines at base, and an intermediate more distinct continued one; *posterior feet* remarkably robust, hardly longer than the ultimate segment; nail very robust, as long as the two preceding joints conjunctly.

A very remarkable species, distinguished at once from all others, by the very thick and short posterior pair of feet, the nails of which cross each other, and are much used by the animal in its defence.

GENUS GEOPHILUS. *20. 4*

Posterior pair of feet not remarkably longer than the others; eyes obsolete.

SPECIES. 1. *G. *rubens*. Body attenuated before and behind; terminal pair of feet hardly longer than the preceding pair.

My Cabinet.

Body broadest in the middle, impunctured, red, with short hairs more numerous on the antennæ and feet; segments with two longitudinal impressed lines, and a transverse acute one near the base of each, ultimate segment somewhat longer than the preceding, narrowed and rounded at tip; *head* beneath, with a blackish spot each side at the base of the mandibles, and another at base of the terminal joint; *labium* with a profound fissure, not dentated; *antennæ*, terminal joint longer than the preceding ones, and of equal diameter, not attenuated; *feet* subequal.

Very common in decaying wood, under stones, &c.

2. *G. *attenuatus*. Body attenuated from the head, posterior feet longer than the others.

Inhabits the Southern States.

Body broadest before and gradually attenuated to the tail, reddish-brown, with a few hairs; *head* and *base* of the *mandibles* above punctured; *antennæ* setaceo-filiform, with numerous short hairs; *feet* paler than the body, posterior ones longer than the others.

Found under stones, &c.



A Description of some new species of Plants, recently introduced into the gardens of Philadelphia, from the Arkansa territory. By THOMAS NUTTALL. Read, August 7th, 1821.

1. *COREOPSIS *tinctoria*, foliis radicalibus pseudo-bipinnatis, foliolis subovalibus integris glabris, superioribus pseudopinnatis laciniis linearibus; floribus binatis ternatisve; calicibus exterioribus brevissimis; radiis bicoloribus; seminibus nudis immarginatis.

Habitat. Throughout the Arkansa territory to the banks of Red river, chiefly in the prairies which are subject to temporary inundation.—Flowering, from June to October.

DESCRIPTION. Annual and biennial, stem erect, smooth, and much branched, extremely variable in magnitude, being from one to five feet high. The

leaves, in common with the genus, are somewhat thick and succulent, the primary ones simple, radical pseudobipinnate, the segments also occasionally pinnate, oblong-oval, commonly smooth, and entire, the ultimate divisions largest. Flowers often terminating the branchlets by pairs, with the peduncles unusually short. Exterior calix, minute, much shorter than the interior, and in common with it, and the number of rays mostly eight-leaved. Rays three-lobed at the extremity, of a bright orpiment yellow and brown towards the base; disk brown, and rather small. Receptacle paleaceous, the leaflets deciduous. Seed small, blackish, immarginate, curved, and naked at the summit.

Economical Use. The flowers of this species afford a yellow dye, in common with those of the *C. senifolia*.

As an ornamental plant, of easy culture and uncommon brilliance, it promises to become the favourite of every garden where it is introduced.

2. *HELIANTHUS* **petiolaris*, annuus; foliis alternis ovatis acutis integrisculis, longissime petiolatis scabris; caule erecto ramoso; floribus longe pedunculatis; seminibus villosis.

Habitat. On the sandy shores of the Arkansa. Flowering in August.

DESCRIPTION. Annual, and with the stem much branched from the base. Leaves mostly alternate, ovate, or ovate-lanceolate, and somewhat undulated.

produced upon petioles of an extraordinary length, rather small, and as usual scabrous and three-nerved, appearing somewhat shining and almost destitute of serratures. Peduncles solitary; also of great length. Segments of the calix, linear-lanceolate, acute; leaflets of the receptacle mostly three-toothed. Rays of the flower numerous, bright yellow, the disk dark. Seeds small, and spotted, covered with a silky and fulvous down.

This curious species, so readily distinguished at the first sight, is an ornamental annual of easy culture, remarkable for the smallness of its leaves, and the length of their petioles. The flowers are about 3 or 4 inches in diameter, and the stem low, with spreading branches.

3. *ASTER *graveolens*, viscosus; caule pumilo ramosissimo recurvato rigido; foliis crebris consimilibus lineari-oblongis acutis subamplexicaulibus integerrimis; ramulis exsertis unifloris; calicibus squarrosis.

A. oblongifolius. Nuttall's Genera, 2. p. 156.

Habitat. On the shelvings of rocks, on the banks of the Arkansa and Missouri.—Flowering time, from August to December.

DESCRIPTIVE OBSERVATION. Perennial. Stem about a foot high; under cultivation more than double that altitude, its texture somewhat woody below, and very brittle, the main branches are commonly recurved, and very copiously and regularly sub-divided so as to form a roundish annual bush of an almost

even contour. The leaves are somewhat crowded, and similar in appearance, covered with a minute and viscid pubescence, communicating to the plant a strong and somewhat balsamic odour, very similar to that of *Gnaphalium americanum*. The rays of the flower are of a violet blue, and the disk yellow.

This is a very elegant, hardy, and ornamental perennial, decorating the gardens with a profusion of flowers at a season when all the others are generally destroyed by the frosts. I have altered the unmeaning name, which I had first bestowed from the inspection of an imperfect specimen.

—B. *Subgenus* PHRYGIA.

4. *CENTAUREA* **americana*, annua; caule præalto parçè ramoso, sulcato; foliis sessilibus, inferioribus oblongo-ovatis repando-denticulatis, superioribus lanceolatis acutis; pedunculis apice incrassatis; foliolis calicinis ovalibus appendiculato-pennatis recurvatis.

Habitat. On the banks of streams, and in denuded alluvial situations, throughout the plains or prairies of the upper part of Arkansa territory.—Flowering time, July and August.

DESCRIPTIVE OBSERVATION. Stem 4 to 6 feet high, smooth; leaves a little scabrous when dry. The calix is large and partly globular, its segments furnished with pennate, recurved, sphacelous, and shining appendages, the internal ones purplish. Rays of the flower very long, and tinged with red. Receptacle copiously pilose; the seed also furnished with the

usual unequal pappus. This species appears scarcely distinguishable from *C. austriaca*. Like most of the genus, it is a hardy annual, or biennial.

5. *DONIA* **ciliata*, foliis oblongis obtusis subamplexicaulibus ciliato-serratis; laciniis calicinis linearibus planis seto acuminatis; caule herbaceo.

Habitat. On the alluvial banks of the Arkansa, and Great Salt River.—Flowering time, from August to October.

DESCRIPTIVE OBSERVATION. Biennial. The whole plant smooth and shining, with the calix less resinous than in *D. squarrosa*, the segments not filiformly reflected, and the receptacle partly paleaceous. The serratures of the leaves are somewhat distant, and obtuse, but setaceously pointed as in *Carthamus tinctorius*. Each branch and branchlet, as in the other species, is terminated by a subsessile flower.

There are few more desirable ornaments for the autumnal flower garden than this and No. 3. The flowers are large and of a bright golden yellow. The plant also attains the height of 4 or 5 feet, and is perfectly hardy.

Locality.—Cultivated in the garden of the University of Pennsylvania.

6. *ŒNOTHERA* **triloba*, acaulis; foliis interrupte pinnatifidis dentatis glabris; petalis apice trilobis; capsulis quadrialatis magnis.

Habitat. In the arid and partly denudated prairies of Red river.

OBSERVATION. Annual and perennial; its duration, like *Æ. caespitosa*, being checked or extended by the incidents of its mode of growth. The leaves are larger and more deeply divided than is usual in this genus, the segments are directed upwards, are acute, and denticulated, the terminal portion being the largest. Flowers pale yellow, vespertine; petals three-nerved, and slightly three-lobed at the extremity. The capsules, which are large, are collected together in such dense clusters, as commonly to stifle the vegetative vigor, and render the plant annual.

This species, more curious than beautiful, but hardy, begins to flower about May, after surviving the winter, but somewhat later as an annual. The flowers appear toward sunset, and die at sunrise.

7. *ÆNOTHERA *speciosa*, puberula; foliis oblongo-lanceolatis dentatis subpinnatifidis; racemo nudo, primo nutante; capsulis obovatis angulatis; caule suffruticosa.

Habitat. On the plains of Red River.—Flowering in June and July.

OBSERVATIONS. Root perennial, and running; the stem, by protection suffruticose. Lower leaves oblong, entire, and irregularly denticulate, succeeded by others which are pinnatifid towards the base. Racemes mostly dichotomal and naked, the flower-buds nodding. Flowers very large and white, becoming rose red on withering; the petals obcordate; stamina exserted; stigmas very long and divaricated.

This very beautiful and ornamental species, opens towards evening, and endures nearly throughout the day ; the period of inflorescence is, however, remarkably evanescent compared with that of the rest of the genus, but it is a perennial of easy propagation.

Cultivated Locality.—The garden of the University of Pennsylvania.

8. *ÆNOTHERA *linifolia*, foliis integris, radicalibus lanceolatis, caulinis linearibus confertis ; racemo nudo terminali ; capsulis obovatis angulatis pubescentibus ; petalibus obcordatis staminibus longioribus ; stigma quadrilobo.

Habitat. On the summits of arid hills and the shelvings of rocks, near the banks of the Arkansa. —Flowering from May to July.

OBSERVATIONS. A remarkably small and biennial species, somewhat allied to *Æ. pusilla* of Michaux. The whole plant, except the capsule, is commonly smooth, the radical and stem leaves are very dissimilar in appearance, the flowers scarcely two lines broad, and yellow ; the bractes of the raceme are ovate, the seeds very small, and the valves of the capsule, as is usual in this section of the genus, open by partial involution from the summit.

9. *ÆNOTHERA serrulata*, foliis linearibus spinuloso-serratis acutis ; floribus axillaribus ; calyces foliolis carinatis ; stigma quadrilobo ; capsulis cylindricis erectis ; caule suffruticosa.

Æ. serrulata, Nuttall's Gen. Am. Pl. 1. p. 246.

9. *STEVIA* **callosa*, annua; foliis linearibus confertis crassiusculis, apice callosis, superioribus alternis; floribus divaricatis subcorymbosis; pappus suboctophyllus erosus brevissimus.

Habitat. On the gravelly banks of the Arkansa; rare.—Flowering from September to October.

OBSERVATIONS. Annual. Somewhat scabrous; stem divaricately branched, brittle. Leaves mostly alternate, sessile, and somewhat succulent, constantly terminating in a yellowish sphacelous or callous point. Peduncles and flowering branchlets glandularly pubescent; the flowers reddish and dispersed, tending, however, to a corymb; the calix cylindric, consisting of about 8 linear leaflets disposed in a single series. Florets from 10 to 12? quite similar to those of *Marshallia* and *Hymenopappus*, bearing a slender tube and a funnel formed five-cleft border. Anthers

Habitat. On the summits of hills, on the plains of Red River and the Missouri.

OBSERVATIONS. This species which is low, perennial and suffruticose, is remarkable in the structure of the calix, the shortness and peculiar disposition of the stamina, and the almost undivided stigma, in all which characters it approaches the genus *Epilobium*, its flowers also expand in the morning in place of the evening. The present variety produces a stigma which is nearly *black*; and a stem considerably branched. It continues to flower nearly throughout the summer, experiencing only a temporary cessation of vigor in the month of August.

Cultivated Locality.—The garden of the University of Pennsylvania.

blackish. Stigma bifid. Receptacle naked. Seed conic, pentangular, terminated by a short eroded paleaceous pappus. This species, excepting in the calix, does not essentially differ from *Hymenopappus*.

Cultivated Locality.—Garden of the University of Pennsylvania.

11. *ASTRAGALUS* **micranthus*, decumbens ; foliolis ellipticis emarginatis glabris ; pedunculis subbifloris, petiolo longioribus ; leguminibus falcatis bica-rinatis glabris ; seminibus truncatis.

Habitat. On the plains of Red River.—Flowering from May to August.

OBSERVATION. Root apparently both annual and perennial, (perennial by cultivation.) Stems numerous and decumbent, a little pubescent, scarcely exceeding a span in length. Stipules subulate, adhering to the stem. Leaflets five to eight pair, smooth, and often deeply emarginated above. Peduncles producing mostly two flowers, sometimes three, which are also unusually small, and of a pale blue color. The divisions of the calix are subulated. The legumes curving upwards, are at length black, and of a thinnish substance, broad and flat beneath, presenting two carinated or angular margins, distinctly two celled. The seeds flattish, and situated so near to each other as to be mutually truncated at the extremities.

Cultivated Locality.—The garden of the University of Pennsylvania.

12. VERBENA, (subgenus. *Glandularia*.) Genus
GLANDULARIA, Gmelin.

Calix tubulosus, quinquedentatus, dentibus setaceis inæqualibus. Corolla limbus quinquefidus subæqualis, lobus emarginatus, ore villosus. Stigma bilabiata.

Foliis trifidis laciniatis oppositis; spica solitaria, pedunculata. Corolla *Buchneræ*.

— Gl. **bipinnatifida*, suberecta, hirsuta, foliis trifidis bipinnatifidis, laciniis linearibus; seminibus impresso-punctatis.

Habitat. On the open calcareous hills of Red River.—Flowering in May and June.

OBSERVATION. Perennial. Leaves trifid, divisions trifidly pinnatifid, somewhat hirsute. Bractes subulate, longer than the calix. Calix tubular, dentures subulate, unequal, the lowest segment very short. Tube of the corolla nearly straight, longer than the calix; border large and flat, five-cleft, the lobes obcordate and emarginate, and with the orifice villous. Stamina fertile, didynamous and included. Style at length exserted, stigma bilabiate, the lobes unequal. Corolla lilac blue, with the border equal and similar to that of *V. Aubletia*, which species the whole plant strongly resembles. These two similar species appear to justify a subgeneric separation from *Verbena*, which had formerly been attempted by Gmelin.

Cultivated Locality.—Garden of the University of Pennsylvania. A hardy perennial, increasing by cuttings.

Observations on several genera and species of fish, belonging to the natural family of the Esores. By C. A. LESUEUR.

On the Genus BELONA of Cuvier.

My observations on this genus incline me to believe, that the *Esox Belona*, described by Dr. Mitchell, is not, as he supposed, the same with that of Europe. The drawings of several species which I have made in the West Indies and the United States gave rise to this doubt, to all of which is alike applicable the short description given us by the Doctor, and it can therefore be merely regarded as a notice of the existence of one of these species in the northern atlantic, and on the coasts of the United States.

Mr. Cuvier observes, that the species of this genus are not yet well distinguished,† that they resemble each other so much, and present at the first view so little difference, that they all might apparently be embraced in the same description; that those who had observed them had been deceived by neglecting to obtain drawings, by which it would have been easy to observe their differences in a manner more sensible and more exact. It is from descriptions, and the comparisons of four different drawings from nature, made in different places, that I now consider myself authorized to distinguish three new spe-

† Regne Animal, Vol. II. p. 186.

cies, which no doubt have been previously observed and considered as one and the same, existing throughout various seas.

Essential Character.

In these fish the maxillary bone forms the whole border of the upper jaw, which, as well as the inferior, is extended into a long snout; they are both likewise armed with small teeth. The mouth has no other teeth than those of the pharynx, which are as it were paved. The body is elongated and covered with scales, which are not very apparent, excepting a longitudinal carinated range on each side, near the lower border. The back is remarkable for its colour, which is of a fine green. The species of this genus differ also somewhat from the *Esoces* in their intestines.

*B. *argalus.*

Dorsal and anal fins unequal, their posterior extremities directly opposite, the anterior part of the anal more advanced; tail deeply forked, lobes arched, the inferior longer; the lamina of the operculum equal; the head depressed.

Body subquadrangular, attenuated to more than three times the length of the beak, the tail laterally carinated. Lower mandible a little longer than the superior. Eyes very large, a little oblong, the pupil somewhat depressed above. Lateral line very low, interrupted by the ventral fins, and beginning to rise above the base of the anal, are then continued

along the middle of the tail upon the carina. Anal and caudal fins falciform, posteriorly narrowed, high and terminating in points anteriorly. Pectoral fins small, longer than the half of the space which separates their base from the tail.

Color of a fine blue upon the back, the under side and the opercula silvery; the iris bluish and argentine. Scales very small.

P. 18.—V. 6.—A. 19.—D. 16.—C. 26.

Collected near the Island of Guadaloupe, in 1816.

*B. *truncata.*

Lower mandible longer than the upper; caudal fin obliquely truncated, ventral small, lateral line passing above and prolonged to the base of the anal fin into its posterior part, where it rises to pass along the carina to the base of the caudal fin.

DESCRIPTION. Body almost quadrangular, more than three times the length of the mandibles, wider upon the back, which is flat and sloping on either side, so as to form a groove along its middle.

On each side towards the back there is a line with an elongated point, and a little lower a small deep blue band, which is continued almost to the base of the dorsal line. Jaws long and pointedly terminated, the inferior a little longer than the superior, armed with fine conic teeth, of which some are longer and distant with small ones between them; teeth of the throat collected upon tubercles. Head flat above:

throat edged; eyes large at the summit of the head, silvery; nostrils before the eyes, in a triangular cavity. Base of the caudal fin depressed and carinated as in the preceding species; caudal fin truncated, lobes arrounded. Anal and dorsal fins as in the preceding. First rays of the pectoral and ventral fins flat and edged. Pectorals small, pointed. Ventrals smaller truncated, situated between the tail and the eye.

Color, a deep blue on the back, with a deeper colored band on each side. Scales very fine, silvery upon the head and abdomen.

B. —P. 16.—V. 6.—D. 16.—A. 19.—C. 20.

Collected at New-York in October 1816; at Philadelphia, and at Newport in Massachusetts.

OBSERVATIONS. At New-York this species is called Gar-fish or Bill-fish. I have also seen it sometimes in the market of Philadelphia.

B. **carribæa*.

Mandibles equal, slender, and pointed; dorsal fin continued further backward than the anal, the last rays also longer; caudal fin scalloped, lobes arrounded, the inferior twice as long as the superior.

Body almost cylindric, more than four times the length of the snout. Head depressed, long and wrinkled above. Eyes large, at the summit of the head, iris blue and silvery, pupil black and notched above. Nostrils large, near to the eyes. Opercula

smooth and flat, the lamina silvery, not very distinct. Both jaws armed with conic pointed distant teeth, producing between them small velvet like teeth, with which the jaws are furnished on each side throughout their whole length. Pectoral fins in a line with the eyes, as long as the space which separates them; the first rays of the pectoral, ventral, and the second of the anal, are flat, strong and edged. The anal and the dorsal fins are narrow posteriorly, and very high and pointed anteriorly, in the form of a sickle. Ventral fins rather long, situated between the eye and the base of the caudal fin. The lateral line commences beneath the origin of the pectoral fins, its base touches the ventral and continues along the abdomen to the base of the anal, where it rises and continues along the carina, so as equally to divide the tail. Seven rays of the tail on each lobe are very flat.

Color, deep blue upon the back, the head, tail, and whitish silvery beneath. Scales as in the preceding species, small, and rounded.

P. 13.—V. 6.—D. 24.—A. 22.—C. 30 $\frac{7}{8}$ flat.

Inhabits the Carribean sea at Basseterre, near the island of Guadaloupe. Collected in 1816. Flesh good and firm.

4. BELONA **Crocodila*. Peron and Lesueur.

If we might judge from the imposing aspect of the individual which we saw, this species appears to attain a very considerable magnitude. It is distinguished from *Esox Belona* and the other species designated and described by a very strong conic straight pointed snout, the bony plates of which are strongly radiated in order to protect the head. The body is less elongated and thicker, more elevated and not carinated towards the tail, the terminating fin of which is lunulated with the lower lobe much longer than the upper. The dorsal and anal fins are falciform, and long, the anterior part elevated, terminating in a point, and equally placed, the posterior very low and straight, more prolonged to the dorsal than the anal fins, ventral rather long and pointed, lunulated, situated nearer the eyes than the tail, pectoral fin small, elevated, placed near to the angle of the operculum. Jaws strong, straight and equal, forming an elongated cone, pointedly terminated and scattered, all armed with strong conic straight and scattered teeth, between the bases of which there are numerous other smaller ones which cover the maxillary bones throughout their length. The scales which cover the body are small. The lateral line commences at the gorge, is undulated under the pectoral fins, passes above the ventrals, and rises a little to continue along the middle of the tail. The color is similar to the preceding species.

P. 14.—V. 6.—D. 22.—A. 21. Caudal 28.

The total length of this individual was thirty-one and a half inches, the head alone was nine and a half from the beak to the termination of the operculum, with a height of about two and a half inches, and nearly two wide between the eyes.

The armature of its jaws renders it dangerous and deservedly feared by those who swim or bathe in the places which it frequents. This was the species in all probability which had been observed by Renard and which is spoken of by Monsieur Delacépède, which had been confounded with the *Esox Belona*.

Collected on the coast of the Isle of France. In the Museum d'Histoire Naturelle, marked R. R. No. 4.

5. *BELONA* **Indica*. This species observed by Perron and myself, makes a near approach to that of Gaudaloupe, and I shall here endeavour to present the characters by which they differ. This species as well as *B. caribæa*, has jaws which are equal, but in this they are more robust, obtuse, and thicker at their extremity while in that they are slender and terminated by a flexible point, it is further recognisable by its obliquely truncated caudal fin, slightly scalloped with arrounded lobes, and the lower one longer : the dorsal and anal fins are likewise similar in form, placed exactly opposite each other, they are also elevated anteriorly, very low and straight, pos-

teriorly. Anal fin narrower. Ventral long pointed. Pectoral longish. Lateral line originating from the throat, passing above the ventrals and almost along the middle of the tail. Scales very small. Teeth as in the preceding species.

P. 14.—V. 5.D . 19.—Caudal 14.

OBSERVATIONS. Body subquadrangular larger towards the head, and attenuated towards the tail, where there is no visible keel. The back, head and tail blue, sides and abdomen silvery, a clearer coloured band towards the back.

We never observed more of this species than the individual which is now preserved in the Museum of Natural History at Paris, and the figure in my collection of drawings.

Inhabits the Indian Ocean.

SCOMBERESOX. LACEPEDE.

In this genus the structure of the snout is similar to that of *Belona*; the appearance of the fish itself the same and covered with similar scales, having a carinated range along the venter; but the latter rays of their dorsal and anal fins are detached into false ones as in the mackerel.

Monsieur Cuvier remarks that he had only seen a single species from the Mediterranean and the ocean. (The *Scombresoces camperien*, of Lacepede, v. VI. 3. *Esox Saurus*. Schneider 78.)

SCOMBERESOX **equirostrum*. Five false fins above and below the tail ; jaws equal and flexible.

Body fusiform, about six times the length of the jaws. Head narrow, rather deep, pointed, eye small. The operculum prolonged behind. Pectoral fins situated a little further back and somewhat higher than the middle of the operculum and slightly arrounded. Dorsal and anal fins equal, low, opposite each other, ventral fins triangular, truncated. Caudal a little notched, with equal lobes.—The color of this individual appeared to me nearly the same as that of the *Belonas*.

P. 14, the first flat and broad. V. 6.—D. 11.—A. 14.—C. 20 rays.

The above notice is taken from an individual preserved and dried in the cabinet of the Linnean Society of Boston, under the name of *Saurus*. It cannot be regarded as sufficiently complete, but may serve to call the attention of others who may have a better opportunity of completing its description.

SCOMBERESOX **scutellatum*. Upper jaw very short, the inferior about twice its length ; pectoral fins very short, situated towards the upper part of the opercula ; six false fins above, and seven below ; the body compressed and edged beneath.

OBSERVATIONS. The body of this small individual was compressed so as to resemble the blade of a knife. It is distinguishable from the preceding also

by the very small pectoral fins placed very high, and near the opercula. The depth of the head was more than twice the diameter of the eye. The ventral fins very small, approaching the anal, and situated a little more towards the head than the dorsal, all of them of the same form, a little elevated anteriorly and somewhat lower posteriorly. The tail is long and narrow, terminated by a lunulated fin. The lateral line was scarcely apparent. The upper and lower maxillar bones were furnished with small teeth, the upper maxillar the shortest, placed in a groove formed by the junction of the two inferior, and leaving a space betwixt them towards the angle of the mouth.

The back was blue, the sides silvery and blueish, and the abdomen argenteous.

P. 13.—D. 11.—A. 12.—V. 6.—A 15

The individual here noticed, I found in the stomach of a fresh codfish which had been brought to Boston from the Bank of Newfoundland; it was still fresh, and had no appearance of putrefaction. Perhaps it might be referred to the *Scombresoces Camperien*, but that this has much longer jaws, a forked tail, and the pectoral fins placed over the middle of the opercula, which forms the distinctive mark between the *Sc. camperii* and the present species.

Another individual discovered by Peron and myself, bears also a considerable affinity to the *Sc. camperii*, in the form of the body and the jaws; but a distinctive character presents itself in the 6th and

7th false fins which are distant from the dorsal and anal fin, which are re-united by a membrane.

HEMIRAMPHUS. CUVIER.

In these the intermaxillary bones form the border of the upper jaw, the margin of the lower one is also furnished with small teeth, but its symphysis is prolonged into a long point, or half beak, destitute of teeth. In their general aspect, their scales and vicera. they still resemble the Belona.

They are found in the seas of both hemispheres ; and their flesh, although oily, is agreeable to the taste.

While Mr William Maclure and myself were passing the islands of the Antilles, we had occasion to observe two species of fish, appertaining to the new genus *Hemiramphus* of Cuvier. These no less than the Belonas and Scombresoces appear to have been confounded together without sufficiently appreciating the species which consequently still remain uncertain. One of those which came under my observation, appears to be that described under the name of *Esox Brasiliensis*. LIN. and BLOCK, 391, which is also the *Esox Marginatus* of LACEPEDE, v. VII. 2. The other appears to be new ; but for the sake of more accurate distinction, I have considered it useful to give the comparative descriptions which I made at different places as at Martinique, Guadaloupe, Dominique, &c. where these species are the object of a particular fishery, sufficiently interesting by the manner in which it is conducted.

The mode of procuring these fish whose flesh is so much esteemed, is with a large seine taken out into the deep water by a company of boats, when the weather is fine. On discovering a shoal of the *balao*, they amuse them by throwing some light body on the water, such as the leaves of the sugar cane, round which they delight to play and jump; the boats outside the fish then let fall the nets, by which they surround, and while drawing the net towards the land, perogues, each occupied by a single negro, follow the net outside, making a noise and throwing stones, in order to chase the fish towards the shore, and to prevent them from leaping over the net and escaping.

HEMIRAMPHUS marginatus. Body three times the length of the lower jaw; pectoral fins shorter than the half of the lower jaw; posterior fins almost equal.

DESCRIPTION. Body subquadrangular, short, equal from the head to the tail as far as the commencement of the anal and dorsal fins. Tail short, terminated by a deeply cleft fin, the lobes slightly arrounded, the inferior a third part longer than the superior. Pectoral fins pointed. Ventral small, and lunulated, pointed interiorly, placed more towards the tail than the head. Dorsal fin longer by a third part than the anal, their form considerably similar, straight, a little elevated anteriorly, the rays separated and free about a third of their length, these two fins also correspond posteriorly. The upper beak is shorter than

the semidiameter of the eye. The inferior very long and flexible. The eye is nearly black, with the upper part of the iris silvery. The scales large. The blue color is most prevalent, particularly upon the upper part of the body, paler along the sides, and argenteous upon the abdomen, the head of a clear blue, and silvery, the tail yellow and bluish; beak brown and deep blue.

P. 10.—V. 6.—D. 14.—A. 12.—Caudal 20 to 24.

HAB. near Guadaloupe and Martinique, where it is called *Balao*.

HEMIRAMPHUS **balao*. Body four times the length of the lower jaw, pectoral fin a third part shorter than the lower mandible; anal fin half as long as the dorsal fin.

It is sufficient to cast an eye over the two figures to recognize their difference, although the two species seem to be the same. In this the body is more elongated and less equal, more elevated upon the back, and more attenuated towards the tail, in this also the fins are longer, the lobes divided by a longer notch are pointed, narrower, and the inferior more elongated; the pectoral, dorsal, anal and ventral fins also more developed, the interior point of the ventral more prolonged; the snout shorter, and lower towards the throat, the lower mandible likewise shorter, but with the upper nearly as in the preceding species. The lateral line commences directly from the gorge, continues along the abdomen as far as the ventral fins,

where it is interrupted, and then proceeds to the tail, passing a little beneath the anal, as in the preceding species.

The colour is nearly the same as in the preceding, only a little deeper, and the caudal fin bluish. The fins contain the same number of rays. Not having time to open the species, I am unacquainted with its sex. It inhabits the Caribbæan sea, near Guadaloupe, Martinique, and Domingo, where in common with the other species, it is known by the name of *Balao*.

HEMIRAMPHUS **erythrorinchus*.

Dorsal and anal fin equal in length and height; upper beak about the length of the diameter of the eye; pectoral fins half the length of the lower jaw; a blue and argentine band on each side continued from the pectoral to the caudal fin.

OBSERVATIONS. Body four times the length of the lower beak from the angle of the mouth to the extremity of the tail. The form of this species differs little from that of the preceding. The dorsal and anal fins, equal in length and height, are perfectly opposite, elevated anteriorly, and at the base posteriorly. Pectoral fins pointed; the ventral small and truncated; the caudal forked, the lobes pointed, the inferior lobe longer. The lateral line, more elevated, passes above the ventral and anal fins, but is not as in the preceding species interrupted by the ventral fin. The eyes are large, and a little oblong,

with an argentine iris. The scales large. Its color the same as the preceding.

P. 13.—V. 6.—D. 16.—A. 18.—C. 21.

In the Museum d'Histoire Naturelle, marked R. R. No. 3, with a note, by Peron, under the above name, and No. 2568 of his Journal, he afterwards considered it as a new genus, which has now been established by Monsieur Cuvier in his *Regne Animal*.

B. A variety of *H. erythrorinchus*.

Near to Timor and the Isle of France, we met with a species which differs a little from the preceding in the form of its body, its color, and the argentine band on the side, but the form of whose dorsal and anal fins were, excepting some difference in the number of the rays, the only distinctive characters which could be remarked. The length of the body, moreover, was in this only three times that of the lower jaw. The dorsal fin is falciform, high, pointed anteriorly, and very low and straight posteriorly. The anal is as long as the dorsal fin, perfectly opposite to it, and almost straight, being only a little elevated anteriorly. The pectoral fins are shorter than the half of the lower jaw. The ventrals small and truncated. Caudal fin deeply forked, the lobes unequal, with the inferior longer.

P. 11.—V. 6.—D. 15.—A. 15.—C. 20. rays.

In the Cabinet of the Museum d'Histoire Naturelle, at Paris : marked R. R. No. 2.

One or other of these two individuals probably appertains to the species observed by Commerson, or the *Esoce* Gambaru of Lacepede, Vol. V. p. 313, tab. 7. fig. 2.

*Analyses of American minerals, by HENRY SEYBERT,
of Philadelphia.*

Of an Amphibole.

The specimen submitted to analysis was found at the Hagley powder mills on the Brandywine, near Wilmington, in the State of Delaware; it is associated with *Quartz*, and on some specimens, minute portions of pyrites were observed, although this mineral, in its external aspect, bears a strong resemblance to the *Hypersthene* and from that circumstance was generally believed, by our mineralogists, to belong to that species. I am inclined to consider it an *Amphibole*, because it is *fusible*, and differs essentially, from the *Hypersthene*, in its chemical composition.

The colour of this mineral in the mass, is dark brown, approaching to brownish black; when pulverized, it is grey; lustre metallic. Slightly translucent on the edges. Form indeterminate. Lamellar. Scratches glass, and gives sparks with steel, Magnetic. Specific gravity, 3. 250. *Fusible* before the blow-pipe into an opaque black glass.

Analysis.

A. 3 Grammes of the pure mineral, finely pulverized, were exposed to a red heat; after the calcination, the powder was of a brownish red colour, and it weighed 2. 97 grammes; then the diminution of

weight amounts to 0.03 grammes; but as the Deutoxide of Iron, contained in the mineral must have absorbed 0.008 grammes of oxygen, in passing to the state of peroxide, the loss due to water, therefore, amounts to 0.038 grammes on 3 grammes, or 1.266 per 100.

B. The calcined mineral (A.) was heated to redness in a silver crucible, during 30 minutes, with 9 grammes of caustic potash; the mixture on cooling assumed a pale green colour; it was treated with water, to which it likewise communicated a greenish hue; this indicated a trace of manganese. Muriatic acid, in excess, was added to it, the solution was complete and of a yellow colour; it was then evaporated to a *dry gelatinous* mass, then treated with water, acidulated with muriatic acid, and again moderately evaporated; more water was then added, and it was filtered; on the filter there remained *Silex*, which, after being washed and calcined, weighed 1.565 grammes on 3 grammes, or 52.166 per 100.

C. The filtered liquor (B.) was neutralized with caustic potash, when treated with the hydro-sulphate of potash, it yielded a black precipitate; this precipitate was well washed and calcined, in a porcelain vessel, to expel the greater part of the sulphur; it was then treated with a small portion of nitric acid, and exposed to a strong red heat, in a platina crucible. The Alumine and per-oxide of iron, thus obtained, weighed 0.45 grammes; they were treated repeatedly with caustic potash, until the Alumine was completely separated, the per-oxide of iron then

weighed 0. 33 grammes ; as the mineral is of a blackish colour and magnetic, the iron exists in the state of a Deutoxide, and the 0. 33 grammes of per-oxide are equivalent to 0. 322 grammes of Deutoxide on 3 grammes, or 10. 733 per 100. Then, by difference, we have Alumine 0. 12 grammes on 3 grs. or 4 per 100.

D. The liquor (C.) when treated with the oxalate of potash, gave rise to an abundant precipitate, which when washed and exposed to a high temperature, yielded *Lime* 0. 60 grammes, on 3 grammes, or 20 per 100.

E. After the separation of the lime, the liquor (D.) when treated with caustic potash, produced a precipitate of magnesia, which being washed and strongly calcined, weighed 0. 34 grammes on 3 grammes, or 11. 333 per 100.

According to the above analysis, 100 parts of this amphibole consist of

A. Water,	01. 266	containing oxygen.	
B. Silix,	52. 166		26. 239
B Manganese, a Trace,	— —		— —
C. Deutoxide of Iron,	10. 733		03. 028
C. Alumine,	04. 000		01. 868
D. Lime,	20. 000		05. 618
E. Magnesia,	11. 333		04. 387
	99. 498		
	100. 000		
	000. 502	Loss.	

2. *Of a Ferruginous Oxydulated Copper Ore.*

This ore occurs in Lebanon County, Pennsylvania, accompanied by oxydulated Iron ore; occasionally by minute portions of pyrites, and is frequently incrustated with green carbonate of copper. Its colour, both in the massive and pulverulent state, is redish brown. It possesses little or no lustre. Opaque. Amorphous. Fracture, irregular. Fragments, indeterminate. Strongly magnetic. The specific gravity of a piece containing some slight traces of carbonate, was 4.554.

Analysis.

A. 5 Grammes, of the pulverized ore, were exposed to a red heat, and it was stirred in order to allow the copper and iron to pass to the state of peroxydes. After the calcination, the powder was black, and the loss of weight was 0.10 grammes; but the quantity of oxygen absorbed by the deutoxide of iron and the protoxide of copper, was found by calculation to amount to 0.249 grammes; therefore, the loss in water amounts to 0.349 grammes, on 5 grammes, or 6.98 per 100.

B. The calcined ore (A.) was boiled with nitromuriatic acid, to which it soon imparted a deep green colour, when the argillaceous residue appeared flaky and colourless; the solution was evaporated to dryness, to expel the excess of acid, the residue of a green colour, was treated with water, and the solution was filtered; the argil remaining on the filter,

when washed and calcined, weighed 0. 19 grammes on 5 grammes, or 3. 80 per 100.

C. The liquor (B.) was treated with an excess of ammonia, an abundant precipitate was formed. part of which was immediately re-dissolved by the ammonia, and communicated to it a beautiful dark blue colour, the residue appeared red, and after 24 hours digestion it was separated from the ammoniacal liquor by filtration, when washed and exposed to red heat, it weighed 2. 16 grammes. A portion of this precipitate was re-dissolved in muriatic acid, and treated with an excess of ammonia, the copper was thus found to have been completely separated. Another portion was fused with caustic potash, but having obtained no mineral cameleon, it was ascertained that the ore contained no manganese. Therefore, the 2. 16 grammes were pure per-oxide of iron, but as the mineral was magnetic, the iron must be estimated in the state of a deutoxide, and the 2. 16 grammes of tritoxide are equivalent to 2. 108 grammes of deutoxide, on 5 grammes, or 42. 16 per 100.

D. The ammoniacal liquor (C.) was boiled to drive off the greater part of the excess of alkali, a slight excess of sulphuric acid was then added to it and a polished bar of iron, was allowed to remain in it, until the liquor, when tested with sulphurated hydrogen, was found to contain no more copper. The metallic copper thus precipitated, when well washed and expeditiously dried, weighed 1. 95 grammes, but from the colour of the ore, the copper must be considered to exist in the state of a protoxide, and the 1. 95 grammes of metallic copper, are equivalent

to 2.194 grammes of protoxide, of copper on 5 grammes, or 43.88 per 100.

E. A portion of the liquor (D.) was found to contain neither lime nor magnesia, therefore, neither of these substances existed in the ore.

The constituents of this mineral, are

Per 100 parts.	
A. Water,	06 98
B. Argile,	03.80
C. Deutoxide of Iron,	42 16
D. Protoxide of Copper,	43 88
	96 82
	100 00
	003 18 Loss.

3. Of a Green Phosphate of Lime (*Asparagus Stone*.)

This mineral was found in London-grove township, Chester county, Pennsylvania. Externally it is incrustated with an opaque yellowish white matter; when broken, it is of a beautiful asparagus green colour; in the state of powder it is white. Lustre vitreous. Transparent. Chrystalized in six sided prisms; the specimens handed to me, presented no well defined terminations. Longitudinal fracture uneven; the transverse fracture, lammellar. Scratch-glass. It does not phosphorize by heat. Specific gravity 3.207. Infusible before the blowpipe.

Analysis.

From preliminary essays it was ascertained, that this mineral contained neither silex, alumine, magnesia, oxide of iron, nor oxide of manganese.

A. 5 grammes underwent no alteration from the action of heat.

B. 5 grammes treated with nitric acid, yielded an entire and colourless solution. Oxalic acid was added to the liquor, it occasioned an abundant precipitate, which, washed and strongly calcined, afforded, lime 2.565 grammes, on 5 grammes, or 51.30 per 100.

C. The liquor (B.) after the separation of the lime, was evaporated to perfect dryness; towards the close of the evaporation, the matter became black, owing to the decomposition of the oxalic acid; when the entire decomposition of the acid was supposed to have been effected, the residue was treated with water, and the liquor, after being filtered, was treated with ammoniac, which occasioned a colourless precipitate of phosphate of lime; this being a portion of the mineral, that resisted decomposition by the oxalic acid, it weighed 0.29 grammes on 5 grammes, or 5.80 per 100.

D The liquor (C.) when treated with the muriate of barytes, afforded phosphate of barytes, equivalent to phosphoric acid 2.042 grammes on 5 grammes, or 40.84 per 100.

According to the preceding results, we have

Per 100 parts.	
B. Lime,	51.30
D. Phosphoric Acid,	40.84
C. Phosphate of Lime,	05.80
	97.94
	100.00
	002.06 Loss.

If the undecomposed phosphate of lime be omitted, the composition of this mineral will be

Per 100 parts.	
Lime,	55.67
Phosphoric Acid,	44.33

This mineral was discovered by Doctor R. Alison, on Alison's Farm, London-Grove Township, imbedded in mica slate.

On two veins of Pyroxene or Augite in Granite.

BY LARDNER VANUXEM.

"The substratum of the soil of Columbia (S. C.) and its vicinity, consists of Granite, the kind which is commonly considered to be primeval. This rock commences at Richmond in Virginia, and is visible to this place in most of the rivers and streams which cross the main road between these two towns. It is the only primitive rock known to exist east of this road. Its usual colour is grey, sometimes it presents very beautiful red varieties as on the Saluda river.

It is very barren in *extraneous* minerals; no marks of stratification appear in it, but it is every where divided by cracks and fissures breaking it up into irregular masses, of no great extent; very often it is traversed by small veins, of an extremely fine grained granite, of a light flesh or pink colour. Like most granite, it is susceptible of decomposition, and varies very considerably in different parts of the same mass, whether exposed to the surface, or covered with vegetable or other soil; thus along the lower canal of the Saluda, whole fields of it are in a decomposed state, here and there presenting among its ruins some masses, which from unknown causes have escaped uninjured. As commonly observed of this rock, it presents large masses rounded upon the surface, ascribable either to the progress of decomposition which commences with the angles and edges or as some have supposed to a species of concretionary arrangement of its minerals, during its consolidation.

Last year my attention was attracted by two parallel black veins in a mass of granite, occurring by the side of Rocky branch,* just below Dr. Fishers mill dam. The surface of the rock protrudes but a little above the ground. These veins lie near to each other, of from one to two inches in thickness, nearly vertical in their position, and of an unknown length and depth. The substance of these veins scarcely

* A small creek passing within a few hundred yards of the South Eastern boundary of Columbia, and emptying into the Congaree.

adheres to the granite, and breaks with ease into irregular fragments, whose sides are slightly changed or soiled, as we so often observe in the trap rocks. In the other fracture, the rock is extremely tough, presenting a very fine scaly texture, of a bluish black colour, opaque, excepting on the edges of the fragments, and enveloping as a base, numerous small imperfect crystals, of a dark green colour; sometimes also, though rarely, fragments of granite are also contained in it. By exposure to the air, the basis becomes of a light dirty olive green colour, whilst the crystals assume an ochery appearance. Examined, when in minute fragments, with a powerful microscope, it presents a confused mass of silvery particles. I was not able to ascertain with this instrument, if it consisted of more than one mineral species. It feebly attracts the magnet. Before the blowpipe, it fuses into a black globule, whose fragments, when viewed by transmitted light, are of a dark green colour. As a part of the rock, which encloses these veins, has lately been removed by blasting, I collected a considerable quantity of their substance, and on breaking it, I succeeded in obtaining some perfect crystals of the dark green substance above mentioned, which on examination, proved to be *Pyroxene*, or augite, presenting the well known form the *triunitaire* of Haüy, so abundant in the lavas of Auvergne, Italy, Sicily, &c. The *hemitrope* or macle of the same form also exists in it.

These veins appear to be almost entirely com-

posed of Pyroxene, more or less confusedly crystallised, and varying considerably in the size of its crystalline particles. It is probable that there is an intermixture of a small quantity of Feldspar, from the difference of colour, which the perceptible and imperceptible particles exhibit when in a state of decomposition. From the general character of these veins, their total dissimilarity with all rocks of the class to which the granite belongs, from their being composed of Pyroxene and of the *triunitaire* form so common in almost all lavas, I think in the present state of our knowledge, (as to the origin of rocks,) that we are in some measure authorized in considering them to be of Volcanic, rather than of Neptunian origin."

Descriptions of Univalve shells of the United States.

BY THOMAS SAY.

The terrestrial and fluviatile shells which form the subject of the following pages, were chiefly obtained on the late expedition to the Rocky Mountains, under the command of Major Stephen H. Long. They are now deposited in the Philadelphia Museum, and constitute, in the collection of that institution, a distinct arrangement.

A few descriptions are added to this essay, of shells discovered in East Florida, Alabama, Pennsylvania, and New-York.

Type and Class.

MOLLUSCA GASTEROPODA.

GENUS HELIX.

† *Umbilicus none ; labrum reflected.*

1. H. **multilineata*. Shell thin, convex, imperforated ; of a brown colour, with numerous dark-red revolving lines, which are minutely and irregularly undulated ; *whorls* six, with elevated, subequidistant lines, forming grooves between them ; *aperture* lunated, not angulated at the base of the column, but obtusely curved ; *labrum* contracting the mouth slightly, reflected, white, more or less distinctly stained by the termination of the spiral red lines, and adpressed to the body whorl near the base ; *umbilicus* covered with a white callus.

Inhabits Illinois and Missouri.

Length of the columella about three-fifths ; greatest width rather more than one inch.

ANIMAL granulated ; *granulæ* large, whitish, interstices blackish ; *foot* beneath black.

An exceedingly numerous species in the moist forests on the margin of the Mississippi near the Ohio, and the Missouri as far as Council Bluff. The red revolving lines are numerous, varying from four or five to twenty-five or thirty and perhaps still more ; they are sometimes confluent into bands ; when viewed within the mouth, they appear sanguineous.

2. *H. *appressa*. Shell depressed, brownish horn colour; *whorls* five, depressed, forming an angle on the external one, more acute near the superior angle of the labrum, with numerous transverse, elevated, equidistant lines, with interstitial grooves; *umbilicus* covered over with calcareous matter, but concave within; *aperture* moderate; *labrum* dilated, reflected, white, margined with brownish; near the base, appressed to the body whorl, and covering the umbilicus; a slight projecting dentiform angle on the inner middle; *labrum* with a strong, prominent, oblique, compressed, white tooth, which gradually slopes and becomes obsolete towards the umbilicus.

Var. a. Labrum with two projecting angles.

Breadth, three-fifths of an inch.

ANIMAL—*foot* pale; *neck* above and each side blackish.

Inhabits the banks of the Ohio and Missouri.

This species is very common on the banks of the Ohio below Galiopolis: I also found it near Council Bluff. It very much resembles *H. tridentata*, but the umbilicus is covered over; the outer lip at base is flattened upon the shell; and there is but a single angle upon it. In Lister's conch. pl. 93, fig. 93, is the representation of a shell, which is most probably intended for this species. Lister's figure is quoted in the books, for *H. punctata*, but as the figure of a different species (Born mus. pl. 14, fig. 17 and 18)

is also referred to as the same, I conclude that two distinct species have been confounded together under the common name of *punctata*; certainly the character from which this name was taken, is never present on our shell. Specimens have been subsequently found by Dr. Thomas M'Euen, near the Falls of Niagara.

3. H. **palliata*. Shell depressed, with elevated lines, forming grooves between them; *epidermis* fuscous, rugose with very numerous minute tuberculous acute prominences; *volutions* five, depressed above, beneath rounded, forming an obtuse angle exteriorly, which is more acute near the termination of the labrum; *umbilicus* covered with a white callous; *aperture* contracted by the labrum; *labrum* reflected widely, white, two profound, obtuse, sinusses on the inner side above the middle, forming a prominent distinct tooth between them, and a projecting angle near the middle of the lip; *labium* with a large, prominent, white tooth, placed perpendicularly to the whorl, and obliquely to the axis of the shell, and nearly attaining the umbilical callus.

Inhabits Illinois.

Length of the column 7-20 of an inch.

Greatest breadth, four-fifths of an inch.

Var. a. A very prominent acute carina; destitute of minute prominences. Inhabits Ohio. Breadth nearly 1 inch.

This shell is found on the banks of the Mississippi in moist places. It very much resembles *H. tridentata* but is destitute of umbilicus, has a rugose epidermis, and is much larger. It is still more closely allied to *appressus* but its superior magnitude, teeth and epidermal vesture, distinguish it from that species. Specimens have subsequently been found by Dr. Thomas M'Euen near the falls of Niagara.

4. *H. *inflecta*. *Spire* convex; *volutions* five, wrinkled across; *suture* not profoundly impressed; *aperture* strait; *labrum* reflected, bidentate, teeth separated by a profound sinus, the superior teeth inflected, behind the lip a profound groove, which abruptly contracts the aperture in that part, so that although the lip is reflected, yet its edge is not more prominent than the general exterior surface of the body whorl, at base the lip is adpressed and covers the umbilicus; *labrum* with a large prominent oblique lamelliform tooth; *umbilicus* closed.

Greatest transverse diameter nearly 9-20 of an inch.

Inhabits Lower Missouri.

The teeth of the labrum somewhat resemble those of *tridentata*; but in the form of the groove behind the labrum, and the pillar tooth, it resembles *H. hirsuta*, several specimens were found, but all dead shells, and destitute of their epidermis.

5. H. **clausa*. Shell fragile, slightly perforated, subglobular, yellowish horn-colour, above convex; whorls four or five; *aperture* slightly contracted by the lip; *lip* reflected, flat, white, nearly covering the umbilicus.

Inhabits Illinois.

Greatest breadth, from one-half to three-fifths of an inch.

A small and handsome species, which somewhat resembles *albolabris*, but is much smaller, more rounded, and is sub-umbilicate. This shell also occurs though perhaps rarely in Pennsylvania.

6. H. **obstricta*. Shell depressed, with elevated lines forming grooves between them; *epidermis* pale brownish, naked; *volutions* five, depressed above, beneath rounded, with an acute projecting carina; *umbilicus* covered with a white callus, indented; *mouth* resembling that of *H. palliata*.

Inhabits Ohio.

Breadth nearly one inch.

This species is very closely allied to *Helix palliata*, but the epidermis is not covered with small elevations as in that shell, and the carina is very prominent and remarkable.

7. H. **elevata*. Shell pale horn colour, *spire* elevated; *whirls* seven, regularly rounded; *umbilicus*

none; *aperture* somewhat angulated; *labrum* dilated, reflected, pure white, at base adpressed to the body whirl, abruptly narrowed on the inner edge beneath the middle, and continuing thus narrowed to the superior termination, leaving a projecting angle behind the middle; *labium* with a large, robust, very oblique, sub-arquated, pure white tooth.

Greatest breadth, 7-8 of an inch. Column, 9-16.

Found rather common in the vicinity of Cincinnati, Ohio, it seems to be distantly related to *thyroidus*, by the tooth on the labium, but this tooth is much more robust; it differs more essentially by the much more elevated spire, and by the superior half of the dilated lip being abruptly narrowed so as to form a prominent angle near the middle. It is also a much thicker shell.

†† *Umbilicus* closed; *labrum* simple.

8. H. **interna*. Shell yellowish-red; *volutions* six or eight; *whorls* with regular, equidistant, elevated, obtuse lines across them separated by regular grooves; lines obsolete beneath; *spire* convex, little elevated; *aperture* very strait, transverse less than one half of the longitudinal diameter; *labrum* not reflected; *within*, upon the side of the labrum, two prominent lamelliform teeth, of which the superior one is largest, and neither of them attain the edge of the lip; *region of the base of the columella* much indented; *umbilicus* obsolete or wanting.

Transverse diameter more than 3-10.

Height of the columella above 3-20.

Inhabits Lower Missouri.

Of two specimens which I obtained, the larger one had six volutions, and the smaller one had eight; the superior tooth in the larger was concave towards the base of the shell. It is a remarkable and very distinct species.

9. *H. *chersina*. *Shell* subglobose-conic, pale yellowish-white, pellucid, convex beneath; *volutions* about six, wrinkles not distinct; *spine* convex-elevated; *suture* moderate; *body whorl* slightly carinated on the middle; *mouth* nearly transverse, unarmed, the two extremities nearly equal; *labrum* simple; *umbilicus* none.

Inhabits the Sea Islands of Georgia.

Breadth 1-10 of an inch.

Cabinet of the Academy.

A very small species. But one specimen occurred in a Cotton field. It is rather larger than *H. labyrinthica*.

10. *H. *gularis*. *Shell* subglobose, pale yellowish-horn colour, polished, pellucid, beneath near the aperture whitish-yellow opaque; *volutions* six or seven, with prominent somewhat regular wrinkles; *spire* convex, a little elevated; *suture* moderate; *labrum* not reflected; *throat* far within upon the side of the labrum bidentate; teeth lamelliform, of which one

is oblique and placed near the middle, and the other less elongated placed near the base; *umbilicus* none.

Breadth more than 1-4 of an inch.

Inhabits Ohio and Pennsylvania.

In general form it resembles *H. ligera*, but may be distinguished by the absence of umbilicus, and upon particular examination, by the teeth which are situated far within the aperture. In the collection of the Academy.

††† *Umbilicated ; labrum simple.*

11. *H. *ligera* Shell subglobose, pale yellow horn colour, polished; *body whorl*, pellucid, yellowish-white, opaque beneath near the aperture; *volutions* rather more than six, all excepting the apical one wrinkled across; *spire* convex, a little elevated; *umbilicus* very small; *suture* not deeply impressed; *labrum* not reflected.

Inhabits Missouri.

Greatest length 3-10. Oblique length less than 9-20. Transverse diameter less than 11-20.

Approaches nearest to *H. glaphyra*, but is readily distinguished by the greater convexity of the spire, and the smaller umbilicus. Rather common. In Lister's conch. on pl. 81, fig. 82, a shell is represented which may be intended for this species.

12. *H. *solitaria*. Shell subglobose, with two or three revolving, rufous lines; *spire* conico-convex;

volutions five and a half, wrinkled across and rounded; *suture* rather deeply impressed; *aperture* wide, embracing a rather small portion of the penultimate whorl; *labrum* not reflected; *umbilicus* large, distinctly exhibiting all the volutions to the apex.

Greatest transverse diameter, nearly one inch and one fifth.

Inhabits Lower Missouri.

But a single specimen was found; it was a dead shell, destitute of its epidermis. It is a very distinct species.

13. *H. *jejuna*. *Shell* subglobular, glabrous, pale reddish-brown; *volutions* five, slightly wrinkled, regularly rounded; *spire* convex; *suture* rather deeply impressed; *aperture* dilate-lunate; *labrum* a little incrassated within, not reflected; *umbilicus* open, small;

Breadth rather more than 1-5 of an inch.

Inhabits the Southern States.

ANIMAL—light reddish-brown, with a granular surface, longer than the breadth of the shell; oculiferous tentacula elongated, and rather darker than the body.

This shell is very closely allied to *H. sericea*, of Southern Europe, but it differs from that species in being destitute of the hirsute vesture. I found several specimens of *jejuna*, during an excursion some

time since into East Florida, at the *Cow fort*, on St. John's river. It is in the collection of the Academy.

14. H. **concava* Shell much depressed; sub-orbicular, horn colour, or whitish, immaculate; *volutions* five, irregularly wrinkled across, more convex beneath; *suture* distinctly impressed; *umbilicus* very large, exhibiting all the volutions to the summit distinctly; *aperture* large, short; *labrum* towards the base very slightly and inconspicuously reflected.

Inhabits Illinois and Missouri.

Greatest width 7-10 of an inch.

Found in moist places near the Mississippi river, on the Missouri as high as council bluff, and on the sea islands of Georgia. It is a much depressed shell.

15. H. **dealbata*. Shell conical, oblong, thin and fragile, somewhat ventricose; *volutions* 6-7, wrinkled across, wrinkles more profound and acute on the spire; *spire* elongated, longer than the aperture, subacute; *aperture* longer than wide, *labrum* not reflected; *umbilicus* small, profound.

Length more than 3-4 of an inch.

Breadth 9-20 of an inch.

In the Cabinet of the Academy and Philadelphia Museum.

Inhabits Missouri and Alabama.

Cabinet of the Academy.

In outline it resembles a *Bulimus*. Four speci-

mens of this species were sent to the Academy from Alabama, by Mr. Samuel Hazard; and a single depauperated specimen was found by myself on the banks of the Missouri.

†††† *Umbilicated* ; *labrum reflected*.

16. H. **profunda*. *Shell* pale horn-colour ; *spire* convex, very little elevated ; *whorls* five, regularly rounded, and wrinkled transversely ; *body whorl* with a single revolving rufous line, which is almost concealed upon the spire by the suture, but which passes for a short distance above the aperture ; *aperture* dilated ; *labrum* reflected, white, and excepting near the superior angle flat, a slightly projecting callus near the base on the inner edge ; *umbilicus* large, profound, exhibiting all the volutions to the apex.

Transverse diameter 19-20 of an inch.

Var. A. Mutilineated with rufous.

Var. B. Rufous line obsolete.

Inhabits Ohio, Mississippi and Missouri banks.

A pretty shell, neatly ornamented by the rufous zone; the spire is very much depressed. Specimens occurred near Cincinnati on the Ohio, and at Engineer Cantonment near Council Bluff, on the Missouri.

Besides the above new species, I have observed in the western regions, the following known species,

December 1821

which I described in the American edition of Nicholson's Encyclopædia, and in the Journal of the Academy.

Helix albolabris common, as far as Council Bluff.
H. thyroidus, on the banks of the Ohio, Mississippi and Missouri. The Animal is of a pale whitish or yellowish colour, immaculate.

H. alternata. On the banks of the Ohio, Mississippi, and Missouri rivers; this species varies in being somewhat larger, and in having a rather more elevated spire. The Animal is of a dirty yellowish-orange colour, the foot obtusely terminated behind, head and tentacula pale bluish, eyes blackish. Shell 9-10 of an inch in breadth.

H. hirsuta, common, as far as Council Bluff.

H. labyrinthica ditto ditto.

H. minuta ditto ditto.

H. perspectiva, occasionally occurs on the banks of the Missouri, and other western streams, and in some parts common.

GENUS POLIGYRA.

*P. *plicata*. Shell convex beneath, depressed above, spire slightly elevated; whorls five, compressed, crossed by numerous raised equidistant lines, which form grooves between them; aperture sub-reniform, labrum reflected, regularly arquated, describing two-thirds of a circle, within two-toothed, teeth not separated by a remarkable sinus; labrum with a profound duplication, which terminates in an

acute angle at the centre of the aperture; *beneath*, exhibiting only two volutions, of which the external one is slightly grooved near the suture.

Breadth 1-4 of an inch.

Inhabits Alabama.

Cabinet of the Academy.

This species is about the same size with *P. avara*, but, besides other characters, it is sufficiently distinguished by the acute fold of the *labrum*. It was sent to the Academy by Mr. Samuel Hazard.

GENUS PUPA.

1. *P. *armifera*. Shell dextral; oblong-oval or somewhat obtusely fusiform; suture distinct; whorls six, obsoletely wrinkled; aperture longitudinally subovate; exterior lip reflected, but not flattened, interrupted above by the penultimate whorl, and with five teeth, of which the superior one, and that which precedes the basal one, are smallest; *labrum* with an undulated lamelliform tooth, its anterior extremity little elevated, but elongated, so as almost to join the superior extremity of the exterior lip.

Length, 3-20 of an inch.

Inhabits Upper Missouri.

Var. A. The two smaller teeth obsolete or wanting.

Var. B. The basal tooth obsolete or wanting.

Very distinct from *corticaria* in being a much larger and proportionally more dilated shell, and with that species, and the next, seems to belong more pro-

perly to the genus *Carychium* of Muller and Ferrussac.

2. *P. *rupicola*. Shell dextral, attenuated to an obtuse apex, white; *whorls* six, glabrous; *suture* deeply impressed; *labium* bidentate; superior tooth lamiform, emarginate in the middle, and at the anterior tip obsoletely uniting with the superior termination of the labium; inferior tooth placed upon the columella, and extending nearly at a right angle with the preceding; *labrum* tridentate, teeth placed somewhat alternately with those of the labium, inferior tooth situated at the base and immediately beneath the inferior tooth of the labium.

Length, about 1-10 of an inch.

Inhabits East Florida.

I formerly found it abundant on the banks of St. John's river, in E. Florida, and more particularly under the ruins of Fort Picolata, under stones, &c.

It is about the size of *P. corticaria*, and considerably resembles that species, but is sufficiently distinguished by the circumstance, of its gradually decreasing in diameter from the body whirl, to its obtuse tip, and in the character of the mouth, it is widely distinct.

GENUS SUCCINEA.

S. ovalis. (Journ. Acad. Nat. Sciences, vol. 1. p. 15.) A large variety of this species, is found very common on the Missouri, of the length of about 4-5

of an inch. I observed one specimen, which was upwards of an inch long.

GENUS PLANORBIS.

1. *P. *armigerus*. Shell dextral, brownish-horn colour, wrinkles obsolete; *spire* perfectly regular, slightly concave; *suture* well impressed; *umbilicus* profound, exhibiting the volutions; *whorls* four, longer than wide, obtusely carinated above, carina obsolete near the aperture, a carina beneath continued to the aperture; *aperture* longitudinally sub-ovate, oblique; *labrum* blackish on the edge; *throat* armed with five teeth, placed two upon the pillar side, of which one is large, prominent, perpendicular, lamelliform, oblique, and rounded abruptly at each extremity; near the anterior tip, is a small prominent conic acute one; on the side of the labrum, is a prominent lamelliform tooth near the base, and two slightly elevated, oblique, lamelliform ones above.

Length, 1-4 of an inch nearly.

Inhabits Upper Missouri.

Remarkable by the teeth; but these are only discoverable by the microscopical examination of the mouth, and they are situated far within it.

P. trivolvis b carinatus and *parvus* inhabit ponds of water, in the vicinity of Council Bluff.

2. *P. *parallellus*. Shell dextral, with very minute transverse wrinkles, and regular, revolving,

equidistant, parallel, slightly elevated lines; *spire* a little convex; *volutions* four; *aperture* longer than wide; *umbilicus* exhibiting all the volutions.

Breadth, less than 3-20 of an inch.

Inhabits Upper Missouri.

This shell has evidently the habit of a *Helix*, and may probably belong more properly to that genus, but having found it only in a dried up pond, in company with a vast number of aquatic shells, I refer it for the present to this genus.

8. P. **exacuus*. Dextral, depressed, with an acute edge.

Inhabits Lake Champlain.

Cabinet of the Academy.

Shell depressed; *whorls* four, striated across, wider than long, not elevated above the suture, but a little flattened, sides obliquely descending to an acute lateral edge, below the middle; *spire* not impressed; *suture* not profoundly indented; *beneath*, body whirl flattened, on the inner edge rounded; *umbilicus* regular, exhibiting all the volutions to the apex; *aperture* transversely sub-triangular; *labrum* angulated in the middle, arquated near its inferior tip, the superior termination just including the acute edge of the penultimate whorl.

Greatest Breadth, rather less than 1-4 of an inch.

This species was found in Lake Champlain by Mr. Augustus Jessup, who deposited it in the collection of the Academy. Only two specimens oc-

curred. It may be readily distinguished from *P. parvus*, by its more convex form above, the spire not being impressed, and by its very acute lateral edge. It appears to be pretty closely allied to *Planorbis nitidus* of Europe, but it is larger, the umbilicus much more dilated, and the aperture does not embrace the penultimate whorl so profoundly.

4. *P. *campanulatus* Sinistral; whorls longer than wide; aperture sub-campanulate.

Inhabits Cayuga Lake.

Cabinet of the Academy.

Shell sinistral, not depressed; *whorls* four, slightly striate across, longer than wide; *spire* hardly concave, often plane; *body whirl* abruptly dilated near the aperture, and not longer behind the dilatation than the penultimate whirl; *suture* indented, well defined to the tip, the summits of the volutions being rounded; *aperture* dilated; *throat* narrow abruptly; *umbilicus* profound, the view extending by a minute foramen to the apex.

Greatest length of the body whorl, 1-4 of an inch.

Breadth from tip of the labrum, 1-2 inch; at right angles to the last, 2-5 inch.

This shell abounds in some of the small streams, which discharge into Cayuga lake, where it was collected by Mr. Jessup, who presented specimens to the Academy, and to me. It is readily distinguished from our other species, by the sudden dila-

tation of the outer whirl, near the aperture in the adult shell, forming a large oval chamber. The summit of the outer whirl, behind the dilated portion, is not, or hardly elevated above the summits of the other volutions.

GENUS LYMNEUS.

1. *L. *elongatus*. Shell horn colour, tinged with reddish-brown; *spire* elongated, tapering, acute; *whirls* six or seven, slightly convex, wrinkled across; *body whirl*, measured at the back, more than half the total length; *suture* moderately indented; *aperture* less than half the length of the shell; *labium* with calcareous deposit.

Length, one inch and three-tenths.

Inhabits in considerable numbers, the ponds and tranquil waters of the Upper Missouri. It is very distinct from *L. catascopium*, by the much greater proportional length of the spire.

2. *Lymneus columellus*. (Jour. Acad. Nat. Sciences, vol. 1. p. 14.) Var. a. Small, black—from Cold water creek of the Missouri. This is most probably a distinct species, we obtained but a single specimen of it.

3. *L. *reflexus*. Shell fragile, very much elongated, narrow, honey-yellow, tintured with brownish, translucent, slightly reflected from the middle; *volutions* six, oblique, wrinkled transversely; *spire* more than one and an half times the length of the

aperture, acute, two or three terminal whirls vitreous; *body whirl* very little dilated; *aperture* rather narrow; *labrum* with a pale margin, and dusky red or blackish sub-margin.

Inhabits Lakes Erie and Superior.

Total length, 13-10—of the aperture 11-20 of an inch.

This shell is remarkable for its narrow and elongated form, and for the consequent, very oblique revolution of its whirls. When viewed in profile, it has a slightly reflected appearance. It was kindly sent to me for examination by my friends Messrs. S. B. Collins and D. H. Barnes of New York, and was found in Lake Superior by Mr. Schoolcraft. I recollect to have seen a specimen two or three years since brought from Lake Erie, by James Griffiths. It is proportionally longer than *elongatus*.

4. *L. *appressus*. Shell elongated ventricose; *volutions* six; *spire* regularly attenuated to an acute tip, rather shorter than the aperture; *body whirl* dilated, proportionally large; *aperture* ample; *columella* with the sinus of the fold profound, callus perfectly appressed upon the shell, to the base.

Inhabits Lake Superior.

This shell exhibits very much the appearance of *L. stagnalis*, but its body whirl is less proportionally dilated. The callus of the labrum is perfectly appressed to the surface of the whorl even to the base, exactly as in *stagnalis*. I have seen but a single weathered and broken specimen, which was sent me

for examination by my friends Messrs. Collins and Barnes, of New York. It was found in Lake Superior, by Mr Schoolcraft.

Since writing the above, Mr. Jessup presented me with several specimens, which he collected in Canandaigua and Cayuga lakes.

5. *L. *elodes*, *Shell* oblong conic, gradually acuminate, reticulate with transverse lines and longitudinal wrinkles; *whirls* rather more than six; *spire* acutely terminated; *suture* moderately impressed; *aperture* shorter than the spire; *labrum*, inner sub-margin reddish obscure; *labium*, calcareous deposit rather copious, not appressed at base, but leaving a linear umbilical aperture; *body whirl* on the back longer than the spire.

Inhabits Canandaigua Lake.

Var. a. Whirls simply wrinkled across, the calcareous deposit at base, appressed to the surface of the whirl.

This species was found by Mr. A. Jessup; it bears the most striking resemblance to *L. palustris*. The variety was found by the same enterprising mineralogist at Morristown, New-Jersey. I have subsequently received specimens from Mr. S. B. Collins, of New-York, who procured them in a marsh near the Saratoga springs.

6. *L. *desidiosus*. *Shell* oblong sub-conic; *whirls* five, very convex, the fourth and fifth very small, the second rather large; *suture* deeply indented; *aperture* equal to or rather longer than the spire; *la-*

bium, calcareous deposit copious, not perfectly appressed at base, but leaving a very small umbilical aperture.

Inhabits Cayuga Lake.

Length 7-20 of an inch.

Found by Mr. Augustus Jessup. It is closely allied to *L. elodes*, but the whirls are more convex, one less in number, and the two terminal ones are proportionally smaller; the callus of the labium, also, near its inferior termination, is applied still more closely to the surface of the body whirl.

7. *L. *macrostomus*. Shell sub-oval; whirls five, body whirl somewhat reticulated; suture not profoundly indented; spire about two-thirds of the length of the aperture, acute; aperture much dilated; labrum not thickened on the inner sub-margin.

Inhabits Cayuga Lake.

Length one half of an inch, and upwards.

Imperfect specimens of this shell were found on the shore of Cayuga Lake by Mr. A. Jessup, but they are sufficiently entire, to exhibit considerable similarity to some varieties of *L. auricularius* of Europe. It may readily be distinguished from *L. catascopium*, by its much more dilated aperture.

8. *L. *emarginatus*. Shell rather thin, translucent; volutions four, very convex; body whirl large; suture deeply impressed; spire somewhat eroded; mouth two-thirds of the length of the shell.

Length nearly 4-5 of an inch; of the mouth half inch.

Inhabits Lakes of Maine.

This species was discovered by Mr. Aaron Stone.

It is a rather larger, and considerably wider shell than *L. catascopium*, and the emargination visible on a profile view of the umbilical groove, is far more profound.

GENUS PHYSA.

1. *P. *gyrina*. Shell heterostrophe, oblong; whorls five or six, gradually acuminate to an acute apex; suture slightly impressed; aperture more than one half, but less than two-thirds of the length of the shell; labrum a little thickened on the inner margin.

Length rather less than one inch.

Inhabits waters of the Missouri.

Of this species, I found two specimens at Bowyer creek, near Council Bluff. It differs from *P. heterostropha* in magnitude, in having a more elongated spire, and less deeply impressed suture.

2. *P. *elongata*. Shell heterostrophe, pale yellowish, very fragile, diaphanous, oblong; whorls six or seven; spire tapering, acute at the tip; suture slightly impressed; aperture not dilated, attenuated above, about half as long as the shell; columella much narrowed near the base, so that the view, may be partially extended from the base towards the apex.

Inhabits shores of Illinois.

Length 7-10 inch.

Greatest breadth 3-10 nearly.

ANIMAL deep black, immaculate, above and beneath; *tentacula* setaceous, a white annulation at base.

In the fragility of the shell, this species approaches nearest to *columella*. It is very common in stagnant ponds on the banks of the Mississippi. When the shell includes the animal, it appears of a deep black colour, with an obsolete testaceous spot near the base on the anterior side. Its proportions are somewhat similar to those of *P. hypnorum*.

P. heterostropha (Nicholson's Encyc.) Is very common in ponds of the Missouri as far as Council Bluff.

GENUS CYCLOSTOMA.

*C. *marginata*. Shell turreted, pale horn colour, or dusky, obsoletely wrinkled across; *suture* rather deeply impressed; *volutions* six; *aperture* mutic, sub-oval, truncated transversely above by the penultimate whirls, nearly 1-3 the length of the shell; *labium* nearly transverse, colour of the exterior part of the shell; *labrum* equally and widely reflected, thick, white; *umbilicus* distinct.

Inhabits Upper Missouri.

Length 1-5 of an inch.

Size of *Paludina lapidaria*. Lister represents a species on plate 22 fig. 19, which, although rather larger, may possibly be intended for this species; he

denominates it "*Buccinum exiguum Rufum quinq orbium.*" This shell does not perfectly correspond in character with *Cyclostoma* ; it is most probably a Pupa, and if so the specific name must be changed, as the present name is pre-occupied in that genus.

GENUS VALVATA.

V. tricarinata (Nicholson's Encyc.) occurs in considerable numbers in ponds, in the vicinity of Council Bluff.

GENUS PALUDINA.

1. *P. *ponderosa.* Shell somewhat ventricose, much thickened, olivaceous or blackish ; *spire* not much elongated, much shorter than the aperture, eroded at tip, but not truncated ; *whirls* five, slightly wrinkled across ; *suture* profoundly impressed ; *aperture* sub-ovate, more than half the length of the shell ; *labium* with much calcareous deposit, and thickened into a callosity at the superior angle ; *within* tinged with blue.

Inhabits Ohio River.

Greatest length one inch and 11-20.

Transverse diameter one inch and 1-10.

This shell is common at the falls of the Ohio, and is a very remarkably thick and ponderous species. It bears a striking resemblance to *P. decisa*, and has without doubt, been generally considered as the same ; but it differs from that species in being much more

incrassated and heavy ; and although much decorticated and eroded upon the spire, the tip is not truncated. In the labrum also is a distinctive character ; by comparison this part will be perceived to be less arquated in its superior limb, than the corresponding part in *decisa*.

2. *P. *integra*. Shell olivaceous, pale, conic ; whirls six, wrinkled across ; spire rather elongated, entire at the apex ; suture profoundly indented ; aperture sub-ovate, less than half of the length of the shell.

Inhabits the waters of the Missouri.

Length 1-4 inch.

Very much resembles *P. decisa*, the spire however is more elongated, and never truncated at the apex, but always acute.

3. *P. *porata*. Shell obtusely-conic or subglobose ; volutions four, convex, obsoletely wrinkled across ; spire obtuse ; labrum and labium equally rounded, meeting above in a sub-acute angle ; the upper edge of the latter appressed to the preceding whirl ; umbilicus very distinct.

Inhabits Cayuga Lake.

Cabinet of the Academy.

This species which was found by Mr. Jessup, is rather larger and more globose than *P. limosa* to which it is allied, and has a more distinct umbilicus. It resembles *P. decipiens* of Ferrussac, but is much less acute, and rather smaller.

4. P. **lustrica*. Shell conic; whirls slightly wrinkled, convex; suture profoundly indented; aperture oval nearly orbicular; labrum with the superior edge not appressed to the preceding whirl, but simply touching it; umbilicus rather large, rounded.

Length less than 1-10 of an inch.

Cabinet of the Academy.

The smallest species I have seen. The aperture somewhat resembles that of a Valvata, to which genus it may probably be referrible. Mr. Jessup obtained two specimens, on the shore of Cayuga Lake.

GENUS MELANIA.

1. M. **canaliculata*. Shell tapering, horn-colour; volutions about seven, slightly wrinkled; spire towards the apex much eroded, whitish; body with a large obtuse groove, which is obsolete upon the whirls of the spire, in consequence of the revolution of the suture on its inferior margin; this arrangement permits the superior margin of the groove, only, to be seen on the spire, in the form of an obtuse carina on each of the volutions; aperture bluish-white within, with one or two obsolete revolving sanguineous lines; labrum slightly undulated by the groove, and with a distinct sinus at the base of the columella.

Inhabits Ohio River.

Length one inch and one tenth.

Breadth 3-5 of an inch.

Greatest transverse diameter more than 2-5,

Very common at the Falls of the Ohio River. It is probably the largest species of this genus in the United States, and may be readily distinguished from its congeners by its broad groove.

2. *M. *elevata*. *Shell* gradually attenuating to the apex, slightly and irregularly wrinkled, olivaceous; *suture* not deeply impressed; *volutions* nine or ten, with several more or less elevated revolving lines, of which one being more conspicuous gives the shell a carinated appearance; *aperture* oblique, equalling the length of the second, third, and fourth volutions conjunctly.

Length one inch.

Breadth two-fifths.

Inhabits Ohio River.

Distinct from our other species, by the elevated revolving lines.

3. *M. *conica*. *Shell* conic, rapidly attenuating to an acute apex, very slightly wrinkled, olivaceous; *suture* not deeply impressed; *volutions* seven or eight; *aperture* oblique, equalling the length of the second, third, and fourth whirls conjunctly.

Var. a. With from one to three, revolving, rufous or blackish lines.

Length nearly 3-5 inch.

Of the aperture 1-4 inch.

Inhabits Ohio River.

May be readily distinguished from *M. virginica*

by the much more rapid attenuation of the spire, and in the proportional difference in the length of the aperture, which in the *virginica* is not more than equal to the length of the second and third whirls.

4. M. **prærosa*. Shell subglobular, oval, horn colour; *volutions* three or four, wrinkled across; *spire* very short, much eroded, in the old shell, so much so as to be sometimes not prominent above the body whirl, *body whirl* large, ventricose, with a very obtuse, slightly impressed revolving band; *aperture* suboval, above acute and effuse; *within* on the side of the exterior lip about four revolving purplish lines, sometimes dotted, sometimes obsolete or wanting; *labium* thickened, particularly at the superior termination near the angle, and tinged with purplish; *base* of the columella somewhat elongated and incurved, meeting the exterior lip at an angle.

Length about 4.5 inch.

Inhabits Ohio River.

Found in plenty at the falls of the Ohio, the spire is remarkably carious in the older shells, and the penultimate whirl, between the aperture and the spire is also remarkably eroded in many older shells. The spire in the young shell is entire, and but little prominent though acute, and the bands are distinct on the exterior of the shell. This shell does not seem to correspond with the genus to which I have for the present referred it, and owing to the configuration of the base of the columella, if it is not a *Melanopsis*,

it is probable its station will be between the genera *Melania* and *Acatina*. I propose for it the generic name of **ANCULOSA**.

5. *M. *armigera*. *Shell* tapering, brownish-horn colour; *volutions* about six, slightly wrinkled; *spire* near the apex eroded, whitish; *body whirl* with a revolving series of about five or six distant, prominent tubercles, which become obsolete on the spire, and are concealed by the revolution of the succeeding whirls, in consequence of which arrangement there is the appearance of a second, smaller, and more obtuse subsutural series of tubercles on the body whirl; two or three obsolete revolving reddish-brown lines; *aperture* bluish-white within; a distinct sinus at the base of the columella.

Inhabits Ohio River.

Length about one inch.

Distinguished from other N. American species, by the armature of tubercles.

GENUS BULLA.

B. fluviatilis. *Shell* sub-oval, pellucid, pale yellowish white, finely wrinkled; *volutions* three; *body whirl* large with a prominently carinated shoulder bounding the spire; *spire* perfectly flat or slightly concave, giving to the shell a perfectly truncated appearance in that part; *aperture* longer than the columella, oblong-ovate, extending beyond the tip of the spire; *umbilicus* profound, edged by a slight carina.

Length of the aperture 1.5 of an inch.

Greatest breadth somewhat less.

Inhabits the River Delaware.

This species seems to be rather rare; it was discovered by Mr. Aaron Stone, deeply imbedded in the mud; Mr. William Hyde of this city, has since found specimens of it, amongst some dead shells of other genera assembled in a small inlet of the river.

Descriptions of rare plants recently introduced into the gardens of Philadelphia. By THOMAS NUTTALL. Read March 5, 1822.

* NEMOPHILA.†

Calix decemfidus, laciniis exterioribus reflexis. Corolla subcampanulata quinquelobata, lobis emarginatis, ad basin foveolis marginatis staminiferis. Stamina breviter, filamentis nudis. Capsula carnosae unilocularis bivalvis. Semina quatuor.

Herba succulenta annua, caule triquetro; foliis alternis pinnatifidis, pedunculi longissimi uniflori oppositifolii et terminali subracemosi, racemis incurvis, fructibus deflexis. Corolla æstivatione convoluta. *Hydrophyllum* affinis.

N. *Phacelioides*.

DESCRIPTION. Root fibrous annual, but more commonly biennial. Stem fragile, smooth, some-

† From γένος, a grove, and φιλέω, I love, a plant peculiar to shady woods.

what tender and diaphanous, plano-convex, 12 to 18 inches long, branching from the base and decumbent, possessing a tenaceous and elastic centre. Leaves alternate, pinnatifid, somewhat succulent, and on the upper surface a little scabrous, segments 5 or 6 pair, subovate, or lanceolate, acute, partly falcate, and presenting a few incisions; petiole ciliated, its internal base lanuginous. Peduncles one-flowered, terete, very long, sometimes near upon a span, and attenuated towards their extremities, at first remote, and coming out opposite the leaves, but at length, as the period of inflorescence advances, approximating into a kind of raceme, which is primarily curved. Calix campanulate, ten-cleft, the segments ovate and acute, ciliate, the larger connivent and erect, the exterior much smaller and reflected. Corolla pelviform-campanulate, flax flower blue, the lobes oval and naked, obliquely emarginated, before expansion convolute, the exterior base producing 10 purple spots, the internal base furnished with five foveolate nectariferous cavities, with tomentose margins, bearing the stamina. Stamina about half the length of the corolla, the filaments filiform and smooth; anthers sagitate-oblong, brownish-yellow. Style one, bifid, below hirsute. Capsule oval, covered by the connivent calix, somewhat hirsute, one-celled, four-seeded, the seeds by pairs alternately immersed in a fleshy succulent receptacle occupying the whole cavity of the capsule.

HAB. In the shady woods of Cedar prairie, ten miles from Fort Smith, and from thence in similar

situations to the sources of the Pottoe. Flowering in May.

It is a hardy biennial, the seeds germinate in autumn, and the seedlings after surviving the winter, flower in the succeeding spring.

* CALLIRHOE.

Calix simplex, quinquefidus. Capsulæ plurimæ monospermæ in annula congestæ.

Habitu *Sida* consimilis.

C. digitata, glauca, foliis inferioribus pseudodigitatis, subpeltatis, laciniis linearibus subdivisiis glabriusculis, supremis tripartitis simpliciusque, pedunculis subracemosis longissimis.

HAB. In the open prairies near Fort Smith, in bushy places, not very common. Flowering in May and June.

DESCRIPTION. Root tuberous, somewhat fusiform and perennial. Stem simple or sparingly branched, smooth and glaucous, about three to four feet high. Radical and lower leaves like those of a *Delphinium* but the divisions partly peltate, the segments 8 or 9 in number, 3 or 4 inches long, linear, simple, bifid and trifid, the primary radical ones occasionally somewhat hispid, the succeeding foliage smooth. Branchlets merely floriferous, naked, the peduncles a foot or more in length, attenuated and articulated a little below the calix, which is simple and 5-cleft, attenuated at its base, the segments ovate, acuminate. Flowers carmine red, about the size of those

of the common cultivated Mallows; the petals crenulate and distinctly unguiculate. Capsules one seeded, and roughened with depressed punctures, not spontaneously opening, and as in *Malva* and *Althæa* disposed in a ring.

This genus, of which the species are hardy ornamental and perennial, appears to afford an additional link of connection between the genera, *Sida* and *Malva*.

Cultivated by Mr. William Dick in the garden of the University of Pennsylvania, by whom it has been dedicated to the author.

Description and Analysis of the Table Spar, from the vicinity of Willsborough, Lake Champlain.

By LARDNER VANUXEM. Read March 5, 1822.

This mineral, which by some was considered to be Ichthyophthalmite, and by others Grammatite, appears in masses, composed of imperfectly tabular crystals, irregularly grouped together, of a white colour, and presenting a slight pearly lustre in almost every direction in which it is viewed. The crystals present natural joints, parallel to a quadrangular prism, with a rhombic base, whose angles are about 94° and 86° ; other cleavages again divide this prism according to the diagonals of its base; all the joints are easily separated with a knife, and all of these apparently presenting the same degree of smoothness and lustre: no joints are perceptible in the direction of the base. It is fusible into a transparent

colourless glass. Hardness between common glass and carbonate of lime. Specific gravity 2. 89. Accompanying this mineral are small grains of coccolite, whose colour is brown and green; the former ones, no doubt belong to Garnet, the latter, from possessing natural joints, seems to be a distinct substance.

The mineral in question, forms a jelly with muriatic acid: loses nothing by calcination, although maintained for half an hour at a red heat: on examination, I found it to consist of Silix, of Lime, and a small quantity of oxide of Iron. Its analysis was made in the following manner.

150 grains were boiled with muriatic acid, as long as any part appeared to be unattacked; water was then added and the solution filtered, the Silix an insoluble part when calcined, weighed 77 1-2 grains. That no uncertainty should exist with respect to the quantity of Silix, it was a second time repeated upon another portion of the mineral, with precisely the same result.

To the liquor from which the Silix had been separated, carbonate of ammonia was added until it ceased to give any further precipitate; this was separated by filtering, when well dried, it weighed 121 grains; and consisted of carbonate of lime, slightly coloured with oxide of Iron. It was set aside for further examination. The ammoniacal liquor was evaporated to dryness, then calcined; nothing remained but 4 1-2 grains of muriate of Lime, which had escaped decomposition.

Sulphuric acid was added to the Carbonate of Lime, which converted it into Gypsum and dissolved the Iron mixed with it. It was filtered and the Iron so held in solution, was thrown down by ammonia thus separated and calcined, it weighed 2 grains.

The result of this Analysis, gives us on estimating the quantity of lime by difference,

Silex	-	-	77. 5	or per cent.	51. 67
Lime	-	-	70. 5	-	47. 00
Oxide of Iron	-	-	2. 0	-	1. 35
			100. 0		100. 00

But as the Iron appears to be an accidental ingredient in this mineral, the real composition of it will be,

Silex	52. 36	} Containing according to this { 26. 71 } of oxygen.
Lime	47. 64	
		} presumed composition, { 13. 38 }
100. 00		

Hence this mineral is a bisilicate of Lime, if the oxygenous composition of these earths be correct; the quantity of oxygen in the Silex being twice that contained in the Lime.

From the external and other characters of this mineral, and from its chemical composition, it appears to be identical with the rare mineral called *Schaalstein* or Table Spar, although according to the Analysis of Klaproth, this mineral contains 5 per cent. of water. But Berzelius in his new system of mineralogy published in 1819, at Paris, says, "from ex-

periments which I have had occasion to make with this mineral, I am induced to consider the water as accidental. I have examined very pure specimens of Table Spar, which did not contain any at all."

Geological and Mineralogical notice of a portion of the North-Eastern part of the State of New-York.

By AUGUSTUS E. JESSUP. Read March 19, 1822.

On the eastern, and a considerable part of the western shore of Lake Champlain, as far north as Burlington in Vermont, shell Limestone is the only rock that appears; hence, I am induced to believe, that the bed of the lake rests on the Secondary or Fløetz formation. This rock extends in some places four and five miles from the lake on the eastern side, but is seldom found to extend more than a few paces from its western shore: it abounds with fossil reliquiæ; such as Terebratulites, Encrinites, Orthoceratites, and Corallines. Its colour is generally bluish-gray. To the west, it appears to rest on the Primitive, and I think, also to the east. My reasons for supposing it to rest on the primitive, on the Vermont shore of the lake, are the following: 1st. That many of those minerals which occur in the vicinity of the western shore of the lake, are also found imbedded in the same rocks near the eastern shore. 2nd. Near Crown Point in New-York, are very extensive beds of magnetic oxide of iron, and the same variety is also found north-east of this, near Vergennes in Ver-

mont. I think that the Transition, does not interpose between the Primitive and Secondary formations in this vicinity; or, if it does, but partially so. The hills in the vicinity of Lakes George and Champlain, extend in a line nearly north and south; they consist of detached masses, the tops of which are either rounded, or extend nearly in a horizontal line of greater or less extent; their sides are generally very abrupt; their height varies from five to fifteen hundred feet above the level of the adjacent lakes.

At Essex in New-York, the hills of Lake Champlain, retire from its western shore, about six miles; their usual height at this place, is about eight hundred feet. Nine miles north-west of Essex, in the town of Willsborough is a detached mountain mass, which extends from east to west: on its northern face, near its base, is a bed of Garnet-resinite, in primitive Trap: the bed is from six to ten feet in width; it extends from South-east, to North-west, and dips towards the North-east, making an angle of inclination with the horizon, of about thirty-five degrees. The Garnet resinite is accompanied by Tabular Spar, common massive, and granular Garnet, and Pyroxene. This locality was first visited in 1810, by Doct. William Meade; by whose directions I was enabled to find it. The Garnet resinite is also found imbedded in primitive Trap, at Charlotte, in Vermont, eight miles east of Essex.

Three miles south of the upper falls of Lake George, is an abrupt acclivity, the eastern face of which, presents a surface composed apparently of

an entire rock, destitute of herbage, and constituting about three-fourths of the whole height of the mountain; which I suppose to be about twelve hundred feet. The foot of this rock terminates abruptly at the margin of the lake, and extends along its shore for more than half a mile: it is commonly known by the name of Roger's Rock. Near the northern extremity of this rock, a spur sets out towards the east, which is apparently about two-thirds as high as the main body of the mountain: it is on this spur, that the following minerals occur either in veins, or imbedded in primitive Trap, Sienite, or Carbonate of Lime; viz, Augite; Coccolite (*Pyroxene-granuliforme* of Haüy); Sphene; granular and massive Garnet; and Plumbago.

The primitive Trap is well characterised, the Hornblende being in distinct crystalline laminæ, not unlike that which occurs in many places in the vicinity of Philadelphia, particularly at the head of the old canal road, on the Schuylkill, and on the Brandywine, near Wilmington. The rock which I have called Sienite, is composed of Hornblende, and compact Feldspar; it therefore differs from the common Sienite in as much, as the Feldspar does not possess a crystalline structure: the colour of the Hornblende is black, and greenish-black, that of the Feldspar is white and reddish-white, or flesh coloured: the proportion of the Hornblende is very small: this is the most abundant rock in the neighbourhood of this part of lake George.

The Carbonate of Lime is white; its structure is coarse-grained, crystalline: the grains, which are generally about the size of a pea, after having been exposed to the action of the atmosphere, for a considerable length of time, are easily separated between the fingers. In one place I saw a bed of reddish-brown Serpentine, throughout which small specks of Bronzite were thickly interspersed; it was apparently situated in Sienite. It was impossible to ascertain the order of the strata; they appear to dip, towards the north-east and north, and were much interrupted and broken.

Garnet Resinite.

This mineral, constitutes almost the whole of the large bed in the primitive Trap at Willsborough, mentioned in the preceding Geological sketch; its colour in the mass, is brownish-black and reddish-brown; by transmitted light, hyacinth-red, inclining to crimson; by exposure to the air, many specimens, become beautifully iridescent; external lustre, semi-metallic; internal, resinous: translucent: form, indeterminate: fracture, slightly conchoidal: structure, coarse, and fine grained, and compact; grains feebly adhering. Specific Gravity 3. 52.

Common Garnet.

This accompanies the preceding: colour light hyacinth-red: lustre, resinous: transparent: structure, granular; in some specimens indistinctly la-

mellar; grains, less than in the preceding variety: this is not abundant.

Tabular Spar.

This is found interspersed in small beds, in the bed of Garnet resinite, with which it is more or less intimately mixed. Colour, pure and greyish-white; by exposure to the air, it becomes more opaque, than when first taken from the bed; lustre, pearly: the tables are semi-transparent: it occurs in tables confusedly intermixed; a few of which have a tendency to the hexagonal form; this was noticed by Karsten in some of the European specimens of this mineral: the tables are longitudinally striated. It possesses a double cleavage, parallel to the sides of a slightly rhomboidal prism, its angles by the common goniometer are 93° and 87° ; longitudinal fracture fibrous; transverse, uneven: scratches glass: moderately frangible: structure, crystalline: specific gravity 2.98. Phosphoresces by friction and heat.

Augite. First Variety.

This accompanies the Garnet resinite and Tabular Spar, among which it is sparingly interspersed, in grains, of about the size of a small pin's head. As the term, Coccoelite, has been applied to granular Pyroxene, it is probable, that this mineral ought to be classed under that name. Its colour in the grains is emerald green, in powder, greenish-white: exter-

nal lustre, dull; internal, glistening: semi-transparent: scratches glass: cleavage, distinct.

Augite Second Variety.

This variety occurs at Roger's Rock, near Ticonderoga, associated with Feldspar, crystallized Spheue, and Plumbago. Colour of the mass, light blackish-green, by long exposure to the atmosphere, it becomes dark blackish-green; colour of the powder, greenish-white; lustre, dull: opaque, in mass; in thin fragments, slightly translucent: form, regular, octagonal prisms, generally without distinct terminal faces: I have one specimen on which there are two terminated crystals; but I do not know that the form is described: it is an octagonal prism terminated by four faces, two of which correspond with the two principal faces of the *Pyroxene sexoctagone* of the Abbe Haüy; the two other faces may be considered as the result of a decrement upon the edges, formed by the junction of the third terminal face of the sexoctagone with the two principal ones above named: its cleavage, is imperfect: transverse and longitudinal fracture, splintery: fragments, angular: scratches glass: tough: structure, crystalline: the crystals vary from a few lines, to near three inches in diameter. Specific Gravity, 2. 33.

Coccolite, (Pyroxene granuliforme of Haüy.)

The geological position of this, is the same, as the preceding mineral; of which (both from its physical

and chemical characters,) it may be considered as being only a variety. The south face of the bluff near Roger's rock, presents an entire mass, which is composed principally of this mineral; its height is about fifty feet, and length eighty.

Colour, light blackish-green, and black: lustre, generally feeble, sometimes resinous: semi-transparent: fracture in mass, fine grained: scratches glass: structure, granular: the grains, which are small; in some specimens, adhere firmly, in others, feebly. It is accompanied by Sphene, Garnet, Carbonate of Lime, and Feldspar.

Sphene.

This accompanies the Pyroxene and Coccolite. Its colour is reddish and yellowish-brown: lustre resplendent: nearly transparent: crystalline: form *diocædre* of Hauy: that which occurs with the coccolite has no regular form.

Granular Garnet.

This accompanies the Coccolite; and is also found in large masses unmixed with any other mineral: It has been called by some mineralogists, red Coccolite.

Its colour is red, of various shades: grains small, and feebly adhering.

Massive Garnet.

This is found in large masses: it passes into the preceding variety.

The Publishing Committee have great pleasure in acknowledging the very valuable donation lately received by the Academy from their president, William Maclure, Esq.

This donation includes many very rare, costly and splendid works on Natural History, which in addition to those previously in the possession of the Academy, many of which have likewise been presented by Mr. Maclure, constitute one of the most valuable and extensive Libraries of Natural History in the United States.

The succeeding catalogue includes a part only of Mr. Maclure's recent donation, the publication of the remainder is unavoidably postponed for the present. It will appear at the end of the volume, together with a list of donations to the Museum.

JOURNAL

OF THE

Academy of Natural Sciences

OF

PHILADELPHIA.



VOL. II. PART II.



PHILADELPHIA:

PRINTED FOR THE SOCIETY,

BY J. HARDING.

1822.



JOURNAL
OF THE
ACADEMY OF NATURAL SCIENCES
OF
PHILADELPHIA.

JUNE 1822.

List of Officers for the Year 1822.

President.

William Maclure.

Vice Presidents.

Zaccheus Collins, George Ord.

Corresponding Secretary.

Reuben Haines.

Recording Secretary.

William H. Keating.

Curators.

Thomas Say, C. A. Le Sueur, Isaac Hays, M. D.

J. P. Wetherill.

Treasurer.

Jacob Gilliams.

Librarian.

Jacob Peirce.

Committee of Publication.

Thomas Say, Thomas Nuttall, Isaac Hays, M. D.

Isaac Lea, R. E. Griffith, M. D.

Account of the JEFFERSONITE, a new mineral; discovered at the Franklin Iron Works, near Sparta in New-Jersey, by LARDNER VANUXEM and WILLIAM H. KEATING. Described and analysed by W. H. KEATING. Read June 4th, 1822.

About six miles to the north-east of the town of Sparta, in Sussex county, New-Jersey, are to be seen the remains of the old Franklin furnace. This furnace, situate on one of the most beautiful and eligible spots for the working of iron, offers a striking example of the failures which attend all works, which are not conducted with a sufficient degree of attention to scientific acquirements. Placed in the centre of an extensive forest, with an abundant supply of water, surrounded by numerous and inexhaustible beds of ore, at a convenient distance from two good markets, the Franklin works must have appeared to their first owners calculated to become of the highest importance; and such most undoubtedly would have been the result, but for one difficulty which intervened, arrested the operation, and after many fruitless attempts caused the total abandonment of the works. This difficulty was, it is true, of vital importance. It arose from ignorance as to the nature of the ore intended to be worked, and of the minerals which accompany it. Having long attempted to work by the common process, an ore which was of a distinct nature, and which, consequently, required a distinct mode of treatment, they at last threw up in disgust an undertaking which very little science would have made

highly productive. To the late Dr. Bruce, we are indebted for the first light thrown upon this interesting section of our country, and to him the honour of the discovery of the red zinc ore is due. This was, undoubtedly, the first step toward the advancement of that section of the country. The next, and a more important one, was the determination of the real nature of the substance, which had hitherto been considered as a common iron ore, and which is now known under the name of Franklinite, as a combination of the oxides of iron, zinc, and manganese. This discovery was made in the Laboratory of the Royal School of Mines in Paris, in the spring of 1819, and has been published by Professor Berthier, in the 4th volume of the "*Annales des Mines*," 1819.

Having in the month of August last, visited this spot with my friend Lardner Vanuxem, esquire, of the South Carolina College, our attention was directed with peculiar pleasure to a bed of ore, which offered a number of new and interesting varieties of minerals, and which we think bids fair to become as celebrated in mineralogy, as the localities of Uto or Arendal.

It is not my object at present, to enter into an enumeration of the minerals which occur there; this I shall defer, until I am enabled to furnish the Academy with a mineralogical and geological description of that vicinity, an object which Mr. Vanuxem and I have long had in contemplation, and which we shall probably soon accomplish, unless it be previously undertaken by some abler observer. I shall merely state, that the minerals which we collected, in-

clude besides the oxidule of Iron, Franklinite crystallized in regular octahedrons with truncated edges, Garnets of various kinds, and among others, a black emarginated dodecahedral Garnet, analogous to the Melanite of Monte Somma, Chondrodite, the same variety as exists at Sparta, and also a new variety of the same substance, besides many other interesting minerals.

The present communication is intended to make known a mineral, which an attentive examination made by Mr. Vanuxem and myself, has induced us to consider as a new species. Our observations upon this mineral made separately, and at a distance, have led us to the same conclusion; and the analysis which I undertook at his request, has fully confirmed the conclusions drawn from its mineralogical characters. The following description includes, besides my observations, those with which Mr. Vanuxem has favoured me. For the results of the chemical analysis I alone stand answerable.

This mineral has hitherto been found in lamellar masses, the largest of which does not exceed a pigeon's egg, imbedded in Franklinite and Garnet.

It presents three distinct cleavages, two of which are considerably easier than the third. These cleavages lead us for a primitive form to a rhomboidal prism, with a base slightly inclined. The angles of the prism are 106° and 74° , those of the inclination of the base are $94^{\circ} 45'$ and $85^{\circ} 15'$. There is another face, which makes with the vertical face of the prism, angles of 110° and 70° . I have likewise seen, in one

instance, cleavages parallel to a rhomboidal prism of 116° and 64° . I have also obtained cleavages under an angle of about $99^{\circ} 45'$ and $80^{\circ} 15'$. I have not been able to trace the connexion between these and the former, but I am inclined to think, that they result from the combination of the two prisms just mentioned. I had hoped, as some of the cleavages have a tolerable degree of lustre, to have been enabled to determine the angles by the reflecting goniometer, but all my attempts to that effect have proved unsuccessful. I have not been able to obtain a reflection from any one face.

The hardness of this mineral is intermediate between that of Fluor Spar and Apatite. It is very readily scratched by Pyroxene, (Malacolite.)

Its specific gravity varies from 3. 51 to 3. 55. I have in one instance obtained it as high as 3. 64, but I suspect the mineral to have been mixed with Franklinite.

Its colour is dark olive-green, passing into brown.

It is slightly translucent upon the edges.

Its lustre is slight, but semi-metallic upon the faces of cleavage; in the transverse fracture it is resinous.

The fracture is lamellar when in the direction of cleavage, otherwise it is uneven.

When scratched with a knife, the streak is grayish.

The colour of the powder is a light-green.

Before the blowpipe it melts readily into a dark coloured globule.

It displays no electric signs, either naturally or by heat or friction.

It is not magnetic, either in the common way, or by the ingenious method of double magnetism which we owe to Abbè Haüy.

The acids do not act upon it when cold. When digested a long time with boiling nitro-muriatic acid about 10-100 is dissolved. The residue is of a lighter colour.

Its chemical composition was ascertained by two analyses, the results of which were strikingly similar, and were as follows :*

* The mode of analysis was as follows. Having by preliminary experiments ascertained that this mineral was chiefly composed of silex, lime, oxide of manganese, and oxide of iron, and suspecting the presence of alumine, magnesia and oxide of zinc from its gangues the Franklinite, Garnets, &c. I treated it as follows: the finely pulverized mineral was fused in a silver crucible, with three parts of caustic potash and kept in fusion during half an hour; the fusion was readily obtained, the mineral communicated to the mass a reddish colour, with a greenish tinge on the edges. Having diluted the mass with water, and saturated with muriatic acid, a complete solution ensued. By a careful evaporation to dryness, the silex became insoluble in water slightly acidulated, while all the other ingredients were dissolved. By the addition of a solution of saturated hydro-sulfate of potash, the lime and magnesia (if any,) were separated from the other substances which were precipitated. (Care had been taken to ascertain that the hydro-sulfate used, precipitated neither of these earths.) Oxalate of potash was then added to precipitate the lime, after which, no precipitate resulting from the addition of sub-carbonate of soda, it was evident that this solution contained neither magnesia nor any other substance, except the

Silex	0. 560	containing oxygen	29.14700	29
Lime	0. 151		4.24159	4
Protoxide of Manganese	0. 135		2.95790	3
Peroxide of Iron	0. 100		3.06600	3
Oxide of Zinc	0. 010			
Alumine	0. 020			
Loss by calcination	0. 010			
	0. 986			
Loss	0. 014			
	1. 000			

By assuming the mineralogical formula $4CS^3 + 3mgS^3 + 2FS^3$, which is very nearly that indicated by

alkalies added. The precipitate by the hydro-sulfate, which consisted of the oxides of iron, manganese, and zinc, with alumine, was then calcined and weighed, after which it was re-dissolved in nitro-muriatic acid, (the alumine being in very small quantity was also re-dissolved.) A saturated carbonate of soda, added without excess, precipitated the oxide of iron, leaving those of manganese and zinc. On examining the iron, it was found to have carried down with it the alumine which was readily separated. The oxides of manganese and zinc were then precipitated by sub-carbonate of soda, and separated by means of ammonia, according to the accurate method recommended by Mr. Berzelius, and described by Mr. Berthier in the "Annales des Mines."

The loss by calcination was ascertained by heating it to a white heat in a platina crucible, during a quarter of an hour. The colour of the mineral was slightly altered, it became of a browner hue, and lost one per cent.

The powder was not magnetic, either before or after calcination.

the results of the analysis, we have for the chemical formula,



Silex	20 atoms, containing	60 atoms oxygen.
Lime	4	8
Protoxide of Manganese	3	6
Peroxide of Iron	2	6

Which proportions are so near those of the results of the analysis, that we may adopt them without hesitation. From this formula, we obtain the true composition of this mineral to be,

4 at. <i>Trisilicias Calcius</i>	7619. 60
3 at. <i>Trisilicias Manganosus</i>	6343. 23
2 at. <i>Trisilicias Ferricus</i>	5535. 38

1 atom new mineral 19468. 21

Or else

20 Silex	11928. 40
4 Lime	2848. 24
3 Protoxide of Manganese	2734. 71
2 Peroxide of Iron	1956.82

19468. 21

Which reduced to 1,000 parts gives

Silex	0. 6125 contg. oxygen	3.0808750	30
Lime	0. 1463	.4109567	4
Protoxide of Manganese	0. 1404	.3080376	3
Peroxide of Iron	0. 1005	.3081330	3

0. 9997

This mineral will therefore present, in the new and expressive language of Mr. Berzelius,

$4CS^3 + 3mgS^3 + 2FS^3$ for its mineralogical, &
 $4\ddot{Ca}\ddot{Si}^2 + 3\ddot{Mn}\ddot{Si}^2 + 2\ddot{Fe}\ddot{Si}^3$ for its chemical
 formula.

According to Professor Mohs' new and elegant mode of classifying and describing minerals, this would form a new species, in his genus Augite Spar,* and come immediately after the Pyramido-prismatic Augite Spar (Pyroxene, Haüy.) On account of its many cleavages I would propose to give it as a specific name, the epithet of *Polystome*. It would therefore be thus designated :

CLASS I.

ORDER SPAR.

GENUS AUGITE SPAR.

Species, Polystome† Augite Spar.

Prismatic. P, unknown. Cleavage $P + \infty = 106^\circ$
 $H = 4.5$ $G = 3.51 - 3.60$.

But until Mr. Mohs' system be more generally known and approved of, it may be proper to give this mineral a name unconnected with his arrangement. Accordingly Mr. Vanuxem has proposed to dedicate

* In order to make this species enter fully into the genus Augite Spar, it will be necessary to extend the limits of the specific gravity of this genus ; and instead of from 2.7 to 3.5 make them from 2.7 to 3.6. An alteration which I think Mr. Mohs can by no means object to. Should the cleavages be as I am inclined to consider them, the species would be described as hemi-prismatic instead of prismatic, but this is an alteration which it will always be time enough to make. (Vide Mohs' Characteristic of Minerals, &c. Dresden and Edinburgh, 1820.)

† From *πολυς* many and *στόμα* I cut.

this mineral to Mr. Jefferson; I have readily assented to this proposal, and we now offer this mineral to the public under the name of the JEFFERSONITE. This mineral has hitherto been found in too small a quantity, to offer any utility in the arts. Should it, however, be found in sufficient abundance, it would become valuable as a flux for the iron-works in the vicinity. The absence of magnesia, and the abundance of manganese, seem to make it very valuable for this object.

REMARKS.

The Jeffersonite presents some points of resemblance with the Pyroxene of Haüy, but still it can be well distinguished from it. Its cleavages are essentially different from those of the Pyroxene, but appear to approach some of the faces of crystals of substances which have been united to this species: for instance, the angles in the Diopside (Mussite and Alalite), Fassaite, and in the *Pyroxene analogique*, come very near some of the angles of cleavage obtained in the Jeffersonite. I at first indulged the idea, that these cleavages might be considered as cleavages parallel to the faces of secondary crystals of Pyroxene, but upon reflection I am fully convinced that this is not the case; for the angles which we have measured, cannot be deduced from the others by a strict mathematical calculation, and though they may approximate, they are not the same. Besides, no analogy can warrant us in admitting, that the regular cleavages of one substance can disappear en-

tirely, and be replaced by cleavages parallel to secondary crystals. On the contrary, wherever minerals have been found presenting different orders of cleavage, the first or those parallel to the primitive form were always predominant. Thus in Carbonate of Lime, it is not uncommon to meet the cleavage parallel to the *equiaxe*, but I believe in every instance the *primitive* is predominant. In a rarer and more interesting instance, that of Fluor Spar, Professor Mohs has described, and I have seen in his possession in Freyberg, specimens of the Saxon Fluor which cleaved in the direction of the cube and the dodecahedron, but the octahedral cleavage was very distinct. Before we change our opinion on this point, we must change all our ideas of cleavage, and of its high importance in the determination of minerals.

In the hardness there is also a remarkable difference, the Pyroxene being decidedly harder. The specific gravity is likewise different: the highest specific gravity of Pyroxene recorded by Haüy, is that of a large crystal from Vesuvius, which gave 3.3578. The highest specific gravity indicated by Mohs is 3.5, while that of the Jeffersonite has, in every instance which I have seen, exceeded this limit.

The chemical analysis offers another important difference, in the absence of magnesia, which appears to be essential to Pyroxene.

For these and other reasons, I conceive that there can be no doubt as to the necessity of considering this mineral as a distinct species. I am inclined to believe that a closer study of the Diopside and Fas-

saïte, and of the *Pyroxene analogique*, might lead to their separation from the Pyroxene and union with the Jeffersonite. This is a subject which appears to me fraught with interest, but upon which I am not able to offer any thing but conjectures, as my specimens of these minerals are not as good as would be necessary to enable me to decide this point. I shall merely close these remarks by observing that a similar opinion is, I believe, entertained by Mr. Vanuxem.

On the Gales experienced in the Atlantic States of North America. By ROBERT HARE, M. D. Read May 14th, 1822.

Of the gales experienced in the Atlantic States of North America, those from the north-east and north-west are by far the most influential: the one remarkable for its dryness; the other for its humidity. During a north-western gale, the sky, unless at its commencement, is always peculiarly clear, and not only water, but ice evaporates rapidly. A north-east wind, when it approaches at all to the nature of a durable gale, is always accompanied by clouds, and usually by rain or snow. The object of the following essay, is to account for this striking diversity of character.

When to the lower strata of a non-elastic fluid, heat is unequally applied, the consequent difference

of density (resulting from the unequal expansion,) soon causes movements, by which the colder portions change places with the warmer. These being cooled, resume their previous situation, and are again displaced by being again made warmer. Thus, the temperature reversing the situations, and these reversing the temperatures, a circulation is kept up tending to restore the equilibrium. Precisely similar would be the case with our atmosphere, were it not an elastic fluid, and dependant for its density on pressure, as well as heat. Its temperature would be far more uniform than at present, and all its variations would be gradual. An interchange of position would incessantly take place, between the colder air of the upper regions, and the warmer, and of course lighter air near the earth's surface, where the most heat is evolved from the solar rays. Currents would incessantly set from the poles to the equator below, and from the equator to the poles above. Such currents would constitute our only winds, unless where mountains might produce some deviations. Violent gales, squalls, or tornadoes, would never ensue. Gentler movements would anticipate them. But the actual character of the air with respect to elasticity, is diametrically the opposite of that which we have supposed. It is perfectly elastic. Its density is dependant on pressure, as well as on heat, and it does not follow, that air which may be heated in consequence of its proximity to the earth, will give place to colder air from above. The pressure of the atmosphere varying with the elevation, one stratum of air

may be as much rarer by the diminution of pressure consequent to its altitude, as denser by the cold, consequent to its remoteness from the earth, and another may be as much denser by the increased pressure arising from its proximity to the earth, as rarer by being warmer. Hence when unequally heated, different strata of the atmosphere do not always disturb each other. Yet after a time, the rarefaction in the lower stratum, by greater heat, may so far exceed that in an upper stratum attendant on an inferior degree of pressure, that this stratum may preponderate, and begin to descend. Whenever such a movement commences, it must proceed with increasing velocity; for the pressure on the upper stratum and of course its density and weight, increases as it falls; while the density and weight of the lower stratum, must lessen as it rises. Hence the change is, at times, so much accelerated, as to assume the characteristics of a tornado, squall or hurricane. In like manner may we suppose, the predominant gales of our climate to originate. Dr. Franklin long ago noticed, that north-eastern gales are felt in the south-westernmost portions of the continent first, the time of their commencement being found later, as the place of observation is more to the leeward. This need not surprise us, as it is evident that a current may be produced either by a pressure from behind, or by a hiatus consequent to a removal of a portion of the fluid from before.

The Gulf of Mexico is an immense body of water, warm in the first place by its latitude, in the second

place by its being a receptacle of the current produced by the trade winds, which blow in such a direction as to propel the warm water of the torrid zone into it, causing it to overflow and produce the celebrated Gulf Stream, by the ejection to the north-east, of the excess received from the south-east. This stream runs away to the northward and eastward of the United States, producing an unnatural warmth in the ocean, as well as an impetus, which, according to Humboldt, is not expended until the current reaches the shores of Africa, and even mixes with the parent flood under the equator. The heat of the Gulf Stream enables mariners to ascertain by the thermometer when they have entered it: and in winter this heat, by increasing the solvent power of the adjoining air, loads it with moisture; which, in a subsequent reduction of temperature, is precipitated in those well known fogs, with which the north-eastern portion of our continent, and the neighbouring seas and islands, especially Newfoundland and its banks, are so much infested. An accumulation of warm water in the Gulf of Mexico, adequate thus to influence the ocean at the distance of 2000 miles, may be expected in its vicinity to have effects proportionably powerful. The air immediately over the Gulf must be heated, and surcharged with aqueous particles.

Thus it will become comparatively light; first, because it is comparatively warm, and in the next place because aqueous vapour, being much lighter

than the atmospheric air, causes levity by its admixture.

Yet the density arising from inferiority of situation in the stratum of air immediately over the Gulf, compared with that of the volumes of the fluid lying upon the mountainous country beyond it, may to a certain extent, more than make up for the influence of the heat and moisture derived from the Gulf: but violent winds must arise so soon as these causes predominate over atmospheric pressure, so far as to admit the cold air of the mountains to be heavier.

When instead of the air covering a small portion of the mountainous or table land in Spanish America, that of the whole north-eastern portion of the North American continent, is excited into motion, the effects cannot but be equally powerful, and much more permanent. The air of the adjoining country first precipitates itself upon the surface of the Gulf, then that from more distant parts. Thus a current from the north-eastward is produced below. In the interim the air displaced by this current rises, and being confined by the high land of Spanish America, and in part possibly by the trade winds, from passing off in any southerly course, it is of necessity forced to proceed over our part of the continent, forming a south-western current above us. At the same time its capacity for heat being increased by the rarefaction arising from its altitude, much of its moisture will be precipitated, and the lower stratum of the south-western current mixing with the upper stratum of the cold north-eastern current below,

there must be a prodigious condensation of aqueous vapour. If it be demanded, wherefore does this change produce north-eastern gales only, why have we not northern gales accompanied by the same phenomena? the answer is obvious. The course of our mountains is from the north-east to the south-west. Thus no channel is afforded for the air proceeding to the Gulf in any other course than that north-eastern route which it actually pursues. The competency of the high lands of Mexico to prevent the escape over them of the moist warm air displaced from the surface of the Gulf, must be evident, from the peculiar dryness of their climate; and the evidence of Humboldt. According to this celebrated traveller, the clouds formed over the Gulf, never rise to a greater height than four thousand nine hundred feet, while the table land for many hundred leagues lies between the elevation of seven and nine thousand feet. Consistently with the chemical laws, which have been experimentally ascertained to operate throughout nature, air which has been in contact with water, can neither be cooled nor rarefied without being rendered cloudy by the precipitation of aqueous particles. It follows then, that the air displaced suddenly from the surface of the Gulf of Mexico, by the influx of cold air from the north-east, never rises higher than the elevation mentioned by Humboldt as infested by clouds. Of course, it never crosses the table land which at the lowest is 2000 feet higher.

Our north-western winds are produced, no doubt,

by the accumulation of warm moist air upon the surface of the ocean, as those from the north-east are by its accumulation on the Gulf of Mexico. But in the case of the Atlantic, there are no mountains to roll back upon our hemisphere the air displaced by the gales which proceed from it, and to impede the impulse thus received, from reaching to the shores of Europe. Our own mountains may procrastinate the flood, and cause it to be more lasting and more terrific when it ensues. The course of the wind is naturally perpendicular to the boundary of the aquatic region producing it, and to the mountainous barrier which delays the crisis. The course of the North American continent is like that of its mountains, from north-east to south-west, and the gales in question are always nearly north-west, or at right angles to the mountains and the coasts. The dryness of our north-west may be ascribed not only to its coming from the frozen zone, where cold deprives the air of moisture, but likewise to the circumstance above suggested, that the air of the ocean is not like that of the Gulf, forced back over our heads to deluge us with rain.

Other important applications may be made of our chemical knowledge. Thus in the immense capacity of water for heat, especially when vaporized, we see a great magazine of nature provided for mitigating the severity of the winter. To cool this fluid, a much greater quantity of matter must be equally refrigerated. Aqueous vapour is an incessant vehicle for conveying the caloric of warmer climates to colder

ones. Mistaking the effects for the cause, snow is considered as producing cold by the ignorant; but it has been proved that as much heat is given out during the condensation of aqueous vapour, as would raise twice its weight of glass to a red heat. Water, in condensing from the æriform state, will raise ten times its bulk one hundred degrees. The quantum of caloric which can raise ten bulks 100 degrees, would raise one bulk 1000 degrees nearly (or to a red heat visible in the day) and this is independent of the caloric of fluidity, which would increase the result.

Further, the quantum of heat which would raise water to 1000, would elevate an equal bulk of glass to 2000. Hence we may infer, that from every snow, there is received twice as much caloric as would be yielded by a like stratum of red hot powdered glass.

It is thus that the turbulent wave, which at one moment rocks the mariner's sea-boat, on the border of the torrid zone, transformed into a cloud and borne away towards the arctic, soon after supports the sledge or the snow-shoe of an Esquimaux or Greenlander; successively cooling or warming the surrounding media, by absorbing or giving out the material cause of heat.

Description of a new Crystalline form of Quartz.

By DR. G. TROOST. Read June 4th, 1822.

Among the mineral productions of our country, the beautiful quartz crystals of Lake George are much admired: their apparent irregular shape has often embarrassed those, who, though acquainted with geometrical figures, yet not being in the habit of examining crystals, expected to find in those of Lake George the hexahedral prism terminated by the hexahedral pyramid with isosceles triangular faces; or the dodecahedron, and such little modifications as the *rhombifère*, *plagièdre*, *pentahexaèdre* and *co-ordonné* described by Haüy. In some of these isolated crystals, (as the Abbé Haüy in his treatise has remarked respecting the *Variété prisme bis-alterne*,) the prism has sometimes entirely disappeared; even the smallest faces are nearly invisible, so that the solid being the result of this apparent anomaly, is a *rhomboid* not differing much from the *cube*. In fact such crystals are found occasionally at Lake George: a remarkably beautiful specimen, in the collection of Mr. J. LUKENS, is upwards of one inch long. These varieties are however not new, they have been found elsewhere; but this is not the case with a variety, the description of which, I will proceed to lay before the Academy.

These crystals which we will call *Annulaire*, are *hexahedral prisms* with the edges of their bases bevelled. This new variety is formed by the decrement of one row of molecules parallel to the

summit of the *rhomboid* (the primitive form of the quartz;) and ought to be represented as follows:

The primitive form being a slightly obtuse rhomboid Fig. I. of $94^{\circ} 4'$ and $85^{\circ} 56'$. (See *Traité de Mineralogie* par le Citoyen Haüy, Tom. 2, p. 293. Edition in 4to.)

Fig. 2.

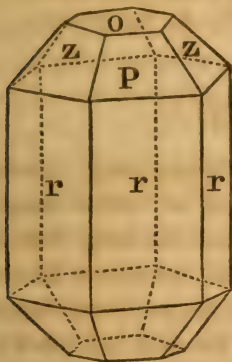
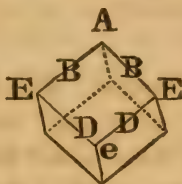


Fig. 1.



Quartz Annulaire

$\begin{matrix} 2 \\ e \end{matrix} P \begin{matrix} \frac{1}{2} \\ e \end{matrix} A \\ 1 \\ r P z o$

Fig. 2. P.

Inclination of P upon r	$141^{\circ} 40'$
z upon r	$141^{\circ} 40'$
P & z upon o	$128^{\circ} 20'$
r upon r	120°

In the same group are several of this form, and one having some of the solid angles of the prism truncated, forming a combination of the rhombifere of the Abbé Haüy and the annulaire described in this paper.

These crystals which are from $\frac{1}{4}$ of an inch to

nearly half an inch long, are imbedded in a cariated quartz, intermixed with a small quantity of carbonate of lime. This specimen is in the collection of Mr. Benjamin Say.

Descriptions of the five new species of the Genus Cichla of Cuvier. By C. A. LE SUEUR. Read June 11, 1822.

1. CICHLA.

C. **ænea*. SPECIFIC CHARACTER. Dorsal fin long; spiny part composed of twelve large rays, longer than the soft part; anal fin long, with six anterior rays. The soft part of the dorsal fin rounded off and elevated. The *eye* large; pupil large, of a very dark blue colour; the Iris red and black; lines of black spots on the sides.

DESCRIPTION. Body short, thick, compressed, elliptic; head of a moderate size; narrow between the eyes; snout short; jaws rounded, furnished with small conical teeth, slightly curved in several rows. Those of the throat and of the palate, conical, small and compressed; mouth extending as far back as under the middle of the eye; inferior jaw somewhat longer than the upper one, which is somewhat protractile; opercles without spines or denticulations. *Eye* large, somewhat prominent; pupil of a very deep black, tinted with bluish; iris black, with a red border surrounding the pupil; eye-lid, varies from yel-

low to red, and to burnt-umber, with a blue margin of a very deep colour in some individuals.

Dorsal fin long; spiny part half as low as the soft part, with large spiny rays, imbricated so as to rest in the dorsal groove; pectorals rounded, placed pretty low and near the operculum. Thoracic fin triangular, sufficiently long to reach the basis of the anal fin, and attached to the thorax by a small membrane; first ray long and thorny; caudal slightly lunulated; lobes rounded; anal long, with six strong spiny rays in the anterior part; these fins are marble-coloured, of a reddish-brown and blue; the soft part of the dorsal fin is maculated with small irregular spots; the anal and dorsal have a black border, and are of a dark-brown at their bases, where the rays are distinguished by their light colour.

The general colour is brilliant coppery, with irregular spots of a blackish-brown, and olive upon the back, the head, and the opercula; the jaws, lips and the throat are black; thorax bluish-grey; these colours, which are very beautiful during the life of the fish, disappear when it dies, and become of a bluish-gray, brown or black; scales round, mutic, large on the sides, smaller on the back and abdomen, small on the breast, on the neck, and on the operculæ, none on the snout and between the eyes; lateral scales with their base, and extremity black, so that by their junction, they produce those lines of black spots which ornament this fish.

Length 8 to 10 inches.

This fish is edible; we took many of them by

means of a hook and line and seine, at Presque Isle, opposite to the town of Erie. They feed upon small scarabæii. The stomach is very strong, folded into three lobes, of which the first is the largest, and furnished with seven cœcums around the neck of the intestine, which is twice folded upon itself.

B. 5.—P. 16.—Tho. 5.—D. 12. 11.—A. 6. 1.—
C. 17 4-4.

2. C. **fasciata*. SPECIFIC CHARACTER. Fourteen or fifteen transverse brown bands on each side of the body, and two or three oblique ones on the opercula, scaly margined with black; spinous and soft parts of the dorsal fin equal in length, the fin less arquated upward than the posterior one.

DESCRIPTION. Body, elongated, compressed, tapering at the two extremities, three and a half times as long as the head, by one length in depth; head of moderate size, narrow, destitute of scales between the eyes, and upon the snout, which is short; mouth extending beneath the eye; jaw large, truncated posteriorly, intermaxillary long and narrow; *teeth* very small, numerous, pointed, curved, and serrated in the manner of a card, on the jaws palate and extremity of the vomer; inferior jaw hardly longer than the superior jaw, mandible strong, enlarged spoon-shaped; *eye* small and round; *iris* white, brown and red; *pupil* small and of a deep colour; *dorsal fin* high, rounded behind, arquated before, and very low at its junction with the soft part, the spinous rays imbric-

cated and reclined into the longitudinal cavity of the back; *anal* rounded, shorter than the soft part of the dorsal, with three spinous rays anteriorly; *pectorals* moderate, rounded; *thoracics* truncated, hardly longer than the pectorals, distant from the anals, and armed with a strong spinous ray; *caudal* slightly emarginate, lobes rounded with 17 principal rays, including the lateral flat ones, beyond which are eight small ones; *scales* rounded, not denticulated, sub-irregularly placed, large on the sides, smaller on the back, small upon the back of the neck, very small under the belly, throat and cheek, and a little larger on the pre-operculum, and sub-operculum; there are also very small ones between the rays of the anal and caudal fins; general colour brownish-olivaceous, deep and fuliginous upon the back, lighter on the sides, the middle of the scales browned with a black margin; anal fin greenish; posterior part of the dorsal and the caudal violaceous, abdomen and throat bluish and violaceous, the 13, 14 and sometimes 15 bands with which this species is ornamented, are a little deeper than the general tint; they are more perceptible in the fresh state of the fish, when but recently taken from the water; the opercula are also traversed with many olivaceous bands, the lateral line is undulated oblique, the colour changes in the dying fish, it is then sometimes all blue or bluish, or entirely black, and the transverse bands disappear.

Length 18 or 20 inches.

This is one of the best fish of Lake Erie for the table, and with that which the fishermen call *herring*

salmon (Corregonus Aretidi, Lesueur, vol. 1, part 2, p. 231;) it is salted to preserve it till sold. They are taken at all seasons of the year, by the seine and hook and line. We observed them at Erie in the month of July 1816, and at Buffaloe, at which latter place we captured many with the seine. A variety occurred in Lake George, of which the specimens appeared to us to have the lower jaw more advanced. The fishermen name them Black bass.

B. 6.—P. 18 to 20.—T. 5.—D. 10 to 15. A. 3-12—C. 17³.

3. C. *Ohioensis*. Extremity of the anal fin sensibly more remote from the head than that of the dorsal; scales more regular than in the preceding species.

The larger of the two individuals which were brought from the Ohio river by Mr. Thos. Say, and deposited in the cabinet of the Academy, is 22 inches long, by five deep, and about three in thickness: the skin of these two specimens, is stronger in its texture than in specimens from Lake Erie, the scales are more uniformly disposed and equal, the anterior portion of the dorsal fin is not so much elevated, less arquated, but also furnished with 10 spinous rays, the soft part is equally long with the first, but is more elevated, rounded and composed of 14 branched rays; the anal fin is rounded, short, with 14 rays, of which the 3 anterior ones, are spinous, the extremity of this fin extends beyond that of the dorsal, in these individuals, further than in the species of Lake Erie. If this character is constant, we must regard it

as belonging to a distinct species, but I think it is proper to wait for further observations for confirmation.

The scales are in the same progression; large, rounded on the sides, moderate on the back towards the spinous portion of the dorsal fin, small upon the neck, upon the middle of the abdomen they are a little more elongated, very small between the thoracic and pectoral fins, on the throat, the cheek, and larger on the preoperculum and suboperculum; the teeth also differ little from the preceding species; the pectoral and thoracic fins are equal and similarly situate; lateral line near the back, a little undulated, originating from the angle of the opening of the operculum, and passing on the middle of the tail; colour, in the dried specimens, yellowish brown; the scales did not appear to me to be margined with black as in the preceding species.

B. 6.—P. 18.—T. 5.—D. 10-14.—A. 3-11.—C. 16³.

4. C. *Floridana*. Dorsal fin with 9 spinous rays anteriorly, and 15 soft ones posteriorly; anal with 3 spinous rays and 13 divided soft ones.

The total length of this fish is one foot five inches, the depth 5 inches towards the dorsal fin; the body is attenuated, more obtuse anteriorly; snout short; inferior jaw a little longer than the superior one; mouth deeply divided; intermaxillary bone long; maxillary bone prolonged unto the end of the eye; *teeth* very small, equal, approximate, card-like

before, smaller and more delicate at the angles of the mouth; on the vomer and on the wings of the palate they are small and like velvet; *eye* round, near the summit of the head; *scales* rounded, large upon the sides near the pectoral fins, diminishing towards the back, and in approaching the tail and the abdomen, smaller, and subequal on all the pieces of the operculum; the snout, and the upper part of the head are destitute of scales; mandible and posterior mandible very strong and broad; dorsal fin divided into two nearly equal parts, the anterior spinous, elevated before, very low behind, and but little arquated; the posterior part more elevated and rounded; the anal fin short, extending beyond the dorsal, as in the species of the Ohio, so that its middle corresponds with the posterior base of the dorsal; the rays of the fins are also much divided and articulated; pectorals small and rounded; thoracic fins subtriangular, as long as the pectorals; operculum without any denticulation, or spine; lateral line oblique, undulated; the colour of this dried specimen is black on the back and lighter towards the abdomen.

We are indebted for this species to the researches of Messrs. Maclure, Ord, Say, and Peale, who brought it from East Florida.

5. *C. *minima*. Dorsal long, spinous and soft parts of equal length, the former straight and very low; anal long, equal to the soft part of the dorsal; eye large.

Body very long sub-compressed, more elevated to-

wards the dorsal anteriorly ; head arquated ; eye very large ; pupil and iris very large ; dorsal fin long, divided into two equal parts, the anterior part of 9 spinous rays, and much lower than the soft part, which is rounded, with 14 divided rays ; anal equal to the posterior part of the dorsal and of 13 rays, of which 3 are spinous ; caudal of 15 to 18 rays ; pectoral large, placed very low near the operculum ; thoracic fin much smaller than the pectoral, and placed exactly beneath them ; anal large ; scales very small ; colour deep gray, tinted with bluish on the back, with metallic reflections on the sides and abdomen, and with points or small black and brown spots on the abdomen and back, and a spot upon the neck ; lateral line straight, on the middle of the body ; caudal fin subtruncated, of 17 or 18 rays ; teeth very small, in many ranges on the jaws and palate ; mouth deeply divided.

Lives in the small lagoons of tranquil water, which discharge by narrow channels into Lake Erie.

Its length is 9 lines.

An account of some of the marine shells of the United States. By THOMAS SAY. Read July 24, 1821.

During occasional visits to our sea coast, and particularly on a journey to East Florida, in company with Messrs. Maclure, Ord, and T. Peale, I availed myself of every favourable opportunity to collect ma-

rine shells, whilst engaged in the pursuit of other and more favourite objects.

No naturalist, however conversant he may be with marine productions, can examine our sea coast for a single day with ordinary assiduity, without discovering something new or interesting to reward his labours, and to gratify his laudable curiosity. Accordingly, these researches furnished my cabinet with a great number of shells which were unknown to me, and of which many appeared to be unnoticed in those works on conchology to which I could obtain access.

But, supposing that these apparently new species, many of which, being either abundant in individuals, or attractive to the eye by beauty of colouring or symmetry of form, had been often observed by foreign naturalists and collectors, and in all probability had long since been transmitted to Europe, and perhaps published in some splendid volume, or, to us, obscure tract, of which the title had not yet reached this country, I was induced to relinquish any further investigation of the subject, and to dwell upon the hope of receiving more exotic information than we already possessed.

This course I was the more readily inclined to pursue, in consequence of being informed that an American zoologist had already commenced the examination of our marine shells, with the intention of publishing the result of his observations. Several years have, however, since elapsed without any addition to our knowledge in this department of Natural History, from the pen of an American author.

Several naturalists who now devote a portion of their attention to conchology, and particularly to that of the United States, having recently requested me to publish an account of our marine shells, I have thought it might be useful to communicate to them immediately, descriptions of those which I do not find to be distinctly described by attainable authors. Such species or varieties, only, are made known in the following essay.

With a view to condense this paper as much as possible, I have omitted the generic characters, but at the same time, I have been careful to subjoin to the generic names that are here adopted, abbreviations of the author's names, who formed them respectively, or whose generic definitions I have followed.

TYPE AND CLASS,
MOLLUSCA GASTEROPODA.

PATELLA. *Lin. Lam.*

*P. *amœna.* Shell oblong-oval, whitish reticulated with reddish-brown, and sculptured with numerous minute concentric wrinkles and close set radii; *margin* entire; *apex* placed behind the middle, and pointing backwards.

Coast of New England states.

Length of a small specimen, 7-20, breadth 1-5 of an inch. Breadth of a larger one 3-10 nearly.

My cabinet.

It may be readily distinguished in general by the beautiful reticulated disposition of the rufous colour,

inclosing small irregularly oval, white, or yellowish-white spots. They sometimes however, are of a uniform greenish or brownish colour. Several specimens of this species were communicated to me by Mr. Aaron Stone, who found them on the coast of Maine.

FISSURELLA, Lam.

SPECIES.

*F. *alternata.* Shell oblong-ovate, moderately thick, cinereous or dusky, with equal concentric lines, crossed by alternately larger and smaller radii, all which are equable or not dilated in any part; *vertex* placed nearer the smaller end; *perforation* oblique, oblong and a little contracted in the middle; *within* white; margin simply crenate; *apex* with an indented transverse line at the larger end of the perforation.

Length four-fifths of an inch.

Breadth three-fifths.

Height more than two-fifths.

Inhabits the coast of the United States.

Cabinet of the Academy, and Philadelphia Museum.

Bears a general resemblance in its sculpture to *F. Græca*, but the radii are not dilated at the points where they are crossed by the concentric lines. I have specimens from the coast of Maryland that measure one inch and a half in length.

CREPIDULA. *Lam.*

SPECIES.

1. *C. fornicata* ? *var.* *Shell* transversely wrinkled, varying in convexity, with obsolete longitudinal, undulated, rufous lines; one side more oblique than the other; *apex* excurved, a little prominent, but not separated from the body of the shell, and generally united with the margin of the aperture; *aperture* suboval; *diaphragm* a little concave, occupying at least half of the length, edge generally reclivate.

Inhabits the coast of the United States.

Length 2 inches.

Cabinet of the Academy and Philadelphia Museum.

Seems to differ from the species as described by Roissy in Sonni. Buff. by having lateral lineations instead of spots. It may very probably be a distinct species.

2. *C. *depressa.* *Shell* very much depressed, transversely wrinkled, nearly equilateral; *epidernis* pale yellowish-brown; *apex* not curved, forming a simple acute terminal angle upon the margin of the aperture; *aperture* subovate; within white; *diaphragm* convex, edge contracted in the middle and at one side.

Length four-fifths of an inch.

Inhabits the southern coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

Differs from the preceding in the form of the beak, which is never arquated.

3. *C. *glauca*. *Shell* thin, convex, glaucous, with minute transverse wrinkles; *apex* conic, acute, not excurved, but declining and distinct from the margin of the aperture; *aperture* oval-orbicular; *within* entirely reddish-brown; *diaphragm* plain or convex, less than half the length of the shell, edge widely contracted in the middle.

Length about half an inch.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

Very distinct from the preceding species.

4. *C. *plana*. *Shell* depressed, flat, oblong oval, transversely wrinkled, lateral margins abruptly deflected; *apex* not prominent, and constituting a mere terminal angle, obsolete in the old shells; *within* white; *diaphragm* occupying half the length of the shell, convex, contracted in the middle and at one side.

Length 1 and 1-10 of an inch.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

A remarkably distinct species, the surface of the shell is flat, and sometimes slightly concave. The

young shell is generally orbicular, and gradually becomes proportionally more elongated as it increases in size. I have found it on the coasts of Maryland, Carolina, Georgia and East Florida, and my brother, Mr. Benjamin Say, discovered it on the shores of New Jersey.

5. *C. intorta?* var. *Shell* convex, ovate, with about twenty elevated, somewhat undulated, lines, with alternate smaller ones; lines somewhat confused on the convex side of the shell, the larger lines with a few slightly elevated, very thick fornicated tubercles; *apex* curving laterally, tip pointing upwards and not elevated from the body of the shell.

Inhabits the southern coast.

Of this shell I found but a single specimen, which is very imperfect. It seems to correspond very well with the description of *C. intorta* of the coast of England, with the exception of the form of the vertex, which in that species is said to *turn downwards*, whereas, in our shell, it not only turns downwards, but the curve is continued until the tip points upwards.

6. *C. *convexa.* *Shell* very convex, obsoletely wrinkled or glabrous, one side vertical, the other oblique; *apex* prominent, decurved, slightly inclining towards the oblique margin, tip generally free and extending lower than the edge of the aperture; *aperture* suboval; *diaphragm* less than half the length of the shell, edge simply arquated.

Length three-fifths of an inch.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

This species is not uncommon, particularly upon our southern coast. The description is drawn from what are termed dead shells, but I have one specimen which is varied with rufous and whitish.

OLIVA, Brug.

SPECIES.

*O. *mutica.* Shell suboval, white, or yellowish-white; *body whirl* with about three revolving maculated bands of pale rufous, of which the superior one is continued upon the spire, the intermediate one is dilated so as to be sometimes confluent with the inferior one, which is narrowest; *spire* short; *suture* very narrow; *columella* destitute of striæ.

Length more than two-fifths of an inch.

Inhabits the southern shores.

Cabinet of the Academy and Philadelphia Museum.

A common shell, varying somewhat in colour; the bands are sometimes deep reddish-brown, sometimes livid, rarely all united and offering only a white line near the base. It seems allied to the *O. zonalis* as described by Lamarck, but is a larger species.

BUCCINUM, *L. Lam.*

*B. *ornatum.* *Shell* subturbinated, with about two bands of arched scales.

Inhabits the coast of East Florida.

Cabinet of Mr. William Hyde.

Shell subturbinated, with numerous revolving striae and intermediate grooves; whitish cinereous, with rufous bands, and transverse, irregular wrinkles, and obsolete undulations separated by somewhat rugged incisures; near the base is a band of ten or twelve elevated arched scales, disappearing in the aperture; whirls flattened above the shoulder, and armed in that part with undulated lamellæ, which on the shoulder are elevated into prominent concave spines; *spire* prominent; *whirls* transversely undulated, the arched scales disappearing towards the tip; *aperture* effuse; *throat* varied with pale green and yellowish, the rufous bands being very distinct; *umbilicus* none.

Length 4 inches. Aperture 2 3-4 inches. Spire $1\frac{1}{2}$ inch.

This fine coronated shell, seems to agree better with the descriptions of *B. armigerum* and *bezoar*, than with those of any other species, as far as I have been able to ascertain. To the latter it seems to be more closely related, with Argenville's figure of which it corresponds in the form and position of the basal band of scales, excepting that it has this band far more oblique; that figure however is much less elongated than our shell, and it appears to have a

double series of prominent scales on the shoulder. The *bezoar*, moreover, is described to be umbilicated, a character which does not exist in our species.

COLOMBELLA, *Lam.*

SPECIES.

*C. *avara.* *Shell* small, covered with a dirty-brownish pigment, beneath which it is whitish reticulated or maculated with rufous; *spire* elevated, acute; *volutions* eight, with spiral impressed lines, and transverse elevated obtuse costa; the costa upon the body whirl are terminated at the middle, and are about eleven in number; *labium* with a distinct plate crenated on the submargin; *labrum* denticulated within, but not very perceptibly thickened on the inner middle.

Length less than half an inch.

Inhabits the coast of the southern states.

Cabinet of the Academy and Philadelphia Museum.

Does not fully correspond with the characters of this genus, as the labrum is not very distinctly dilated on the inner middle, and the spire has the elevation of a *Mitra*.

It is a common species, and occurs as far north as the coast of Maryland.

NASSA, Lam.

SPECIES.

1. N. **vibex*. Shell cancellate, ventricose, cinereous or pale reddish-brown, with two or three irregular, sometimes obsolete darker fascia; *body whirl* with twelve thick, prominent costa, and about as many revolving filiform lines, which are not much elevated, and but simply crenate the costa and lip; *labrum* incrassated, with about two more prominent teeth within; *labium* callous; *spire* short, rapidly attenuated to an acute tip.

Length three-fifths of an inch.

Inhabits the southern and middle coast.

Cabinet of the Academy and Philadelphia Museum.

Rather rare. I found but four specimens. For the locality of the coast of the middle states, I am indebted to my brother, Mr. B. Say, who brought me a specimen from the shores of New Jersey.

2. N. **trivittata*. Shell conic acute, yellowish-white, cancellate so as to appear granulated, granules prominent, equidistant; ten revolving impressed lines on the *body whirl*, and a somewhat more conspicuous groove near the summit of each volution; *spire* as long or longer than the body, and with a rufous revolving line near the suture; *body whirl* trilineate with rufous, the lines placed one near the suture, one

on the middle, and the third rather darker, at the origin of the beak ; *suture* regular and deeply impressed ; *beak* distinguished by a profound depression, from the body whirl, slightly reflected ; *labrum* not incrassated, with raised lines within upon the fauces which do not extend quite to the edge of the lip ; *labium* distinctly lamellar, with an obsolete fold of the basal edge, and a tooth near the superior junction with the labrum.

Length about 7-10 of an inch.

Inhabits the middle and southern states.

Cabinet of the Academy and Philadelphia Museum.

A very common species.

It somewhat resembles Maton and Rackett's figure of *Buccinum macula*, (Linn. Trans. Lond. vol. 8.) in the cancellated appearance, but it is a longer shell and destitute of the incrassated aperture. This species is closely allied to the genus *Phos* of Montfort, by the striated labrum, and the projection or slight fold at the base of the columella, but it has no appearance of umbilicus, a character, which, in the system of that author, is an essential one.

3. N. **obsoleta*. Shell ovate-conic, subacute, cancellate, exhibiting a granulated appearance, dark reddish-brown, or blackish, sometimes tinged with olivaceous ; *spire* shorter than the body ; *suture* not deeply impressed ; *beak* not distinguished from the body whirl by any profound depression, and not prominent ; *labrum* within lineated with elevated,

abbreviated or interrupted lines, not incrassated, purple-black; *columella* at base with a prominence or fold.

Length three-fifths of an inch.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

ANIMAL—*Foot* as long as the shell, rounded before, with the anterior angles elongated, conic, reflected and resembling short tentacula; *head* not extended beyond the shell; *eyes* above the base of the tentacula, placed on their exterior side and black; *tentacula* setaceous, abruptly smaller above the eyes; *trunk* cylindrical, the suture beneath, exerted over the head, half as long as the shell and very conspicuous.

Inhabits the shores of our estuaries in great numbers. When left by the recess of the tide, they collect together in small pools, or crawl in pursuit of the retiring water; but when left quite dry, they burrow in the sand so as to conceal themselves from the action of the sun, and patiently await the returning tide. They assemble about dead crabs and other animals, and appear to feed upon them.

This shell is more frequented by *Pagurus longicarpus* than any other; it bears a general resemblance to the preceding species, but is sufficiently distinguished by being less elongated, the suture and impressed lines not being so profound, and the beak less prominent and distinct; the colour also is very different.

It resembles the shell represented by Lister, plate 976, fig. 32. “*Buccinum B. r. parvum nigrum ex toto læve.*” It is usually covered by a blackish pigment which obscures its character: within the aperture, on many specimens, a dull or obsolete whitish line may be seen.

The description shows the near approach of this shell to Montfort's genus *Phos*, to which it is as closely allied as the preceding species.

4. N. **acuta*. *Shell* conic-acute, whitish, cancelled so as to appear granulated, granules prominent, somewhat transverse, inequidistant, the transverse grooves being more profound and dilated than the spiral ones, which are six in number; *spire* longer than the body whirl, slender towards the tip, acute; *suture* impressed, but not profoundly; *beak* distinguished by a depression from the body whirl, and slightly reflected; *labrum* incrassated, and with elevated lines upon the fauces, which do not attain the edge of the lip.

Length half an inch.

Inhabits the shores of the southern states.

Cabinet of the Academy and Philadelphia Museum.

A species which not unfrequently occurs, it is very distinct from the two preceding ones, and may be readily distinguished from them by the incrassated outer lip.

CERITHIUM, Brug.

SPECIES.

C. *dislocatum. *Shell* attenuated, acute at the apex; *volutions* with numerous, minute, revolving impressed lines, and from fifteen to eighteen transverse, elevated costa to each volution, which are dislocated near the summit of each volution by a revolving line, as deeply impressed as the suture.

Length one and one-fourth of an inch.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

This shell is very common on the southern shores, particularly on that of East Florida, but I have also found specimens on the shore of Maryland. Lister tab. 979, fig. 36, represents a shell very similar to this, but larger.

The effect of the impressed line, which revolves above the middle of the volutions, is, to separate the longitudinal raised lines into two series, whereof the lines of the superior series, are much shorter and thicker than the others.

FUSUS, *Montf.*

SPECIES.

F. **cinereus*. *Shell* with a cinereous epidermis, reddish-brown beneath; *volutions* cancellate, the transverse costa eleven, robust; revolving lines filiform, irregularly alternately smaller, crenating the edge of the exterior lip, which is acute, and alternating with the raised lines of the fauces; *fauces* tinged with chocolate colour; *beak* short, obtuse, not rectilinear; *labrum* not incrassated.

Length one and one-fourth of an inch.

Inhabits the estuaries of the United States.

Cabinet of the Academy and Philadelphia Museum.

I have frequently found this species in oozy places of the bay of Great Egg Harbour, and on the Eastern shore of Maryland. My brother, B. Say, ascertained that it is also an inhabitant of the coast of New Jersey.

RANELLA, *Lam.*

SPECIES.

R. **caudata*. *Shell* pale reddish-brown, cancellate with eleven robust costa to the body whirl, and several revolving filiform lines passing over them, which are more prominent upon the varice of the aperture, terminate at its inner edge, and there alter-

nate with the raised lines of the fauces; *volutions* flattened at their summits, abruptly declining to the suture; *canal* coarctate, rather longer than the spire; *beak* rectilinear, reflected at the tip.

Length one inch.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

A rather common species.

This generic name I think objectionable, inasmuch as it borders too closely upon *Renilla*, which designates a genus of the class Polypi of Lanarck. Montfort's appellation *Buffo* is not preferable for a similar reason, as it would be liable to be confounded with *Bufo*, a genus of Reptilia.

FULGUR, *Montf.*

F. **pyruloides*. *Shell* with spiral striæ alternately larger; *whirls* white, transversely lineated with ferruginous lines, interrupted or obsolete on the middle; above flattened, unarmed; *spire* short; *suture* profoundly canaliculate.

Seba. Vol. 3. pl. 68. fig. 19, 20?

Lister, conch. pl. 877?

Length three inches and four-fifths.

Breadth one inch and one-tenth.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

At first sight this species would be referred to the

genus *Pyrula*, but upon inspection it will be observed to have a fold on the columella. I formerly mistook the young shells for those of *F. caniculata* or *granum*, which they much resemble in form, in the grooved sutures, and in the spiral striæ; but they differ from them in having a much less elevated spire, by being entirely destitute of armature, either of spines or tubercles upon the angulated ridge of the volutions, and by being marked with coloured lines. In this last character they approach *F. perversus*, but they will not be mistaken for that species.

As the shell advances in growth, the acute edge of the depressed top of the whirls becomes obtuse, and in the adult shell it is nearly obsolete; in which state the almost regular curve of the whirl is very like that of *Pyrula*.

Seba's figures above quoted, are probably intended for this species; they certainly represent it very well as it appears in the young state.

I think it highly probable that this is the *Bulla Ficus*, Var. *b.* Gmel. which Dillwyn describes under the name of *Bulla pyrum*, with the country of which he was unacquainted.

PYRULA, Lam.

SPECIES.

P. **papyratia*. Shell inflated, thin, white, with small pale rufous spots, within pale, dull purplish-

red ; *whirls* with numerous spiral striæ, which are alternately larger, crossed by smaller striæ.

Length four inches and one-tenth.

Greatest breadth two inches and one-fifth nearly.

Inhabits the coast of Georgia and East Florida.

Cabinet of the Academy.

This species has been hitherto confounded with *P. ficus*, to which indeed it is closely allied, but differs in having the beak proportionably longer, and in being but slightly spotted.

It is also an inhabitant of the West Indies.

TURBO, *Lin. Montf.*

SPECIES.

1. *T. *irroratus*. *Shell* thick, greenish or pale cinereous, with numerous revolving, elevated, obtuse, equal lines, which are spotted with abbreviated brownish lines ; *suture* not indented ; *spire* acute ; *labium* incrassated, yellowish-brown ; *labrum* within white and thick, at the edge thin, and lineated with dark brownish ; *throat* white ; *columella* with an indentation ; *operculum* coriaceous.

Length four-fifths of an inch.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

This has the general appearance of *T. littoreus*, but is sufficiently distinct by the above characters ; the calcareous deposit on the labium is copious.

An inhabitant of our estuaries of the middle and southern states. I have found them on the Eastern shore of Maryland, and upon the coast of Carolina, Georgia and Florida; and my brother obtained a specimen on the coast of New Jersey, of the length of one inch and one-tenth nearly. Mr. Cuvier would place this shell in the genus *Paludina*.

2. T. **canaliculatus*. *Shell* thin globular, with about four volutions; *body whirl* with four profound striated grooves, and several smaller ones near the base and suture; *suture* profoundly indented; *colour* pale reddish-brown, immaculate.

Length about one-tenth of an inch.

Inhabits the southern coast.

ANIMAL—*foot* shorter than the shell, oval; *tentacula* rather robust, filiform, half as long as the foot; *eyes* at the external base of the tentacula.

I have obtained but a single individual of this species. If it is only an immature specimen, we know nothing of the parent of it.

3. T. **palliatu*s. *Shell* suboval, not remarkably thickened; *whirls* four or five, wrinkled transversely; *spire* short, convex, obtuse, much shorter than the aperture; *suture* moderately indented.

Length about one-third of an inch.

Greatest breadth about the same.

Inhabits the shores of the New England states.

Cabinets of Mr. Aaron Stone, Mr. Wm. Hyde and my own.

July 1822

This species was found by Mr. Aaron Stone on sea-weed, about low water mark. It is often variegated with olivaceous and white, or green and yellowish, so as to exhibit a reticulated appearance; but they are very frequently covered with a greenish, or reddish-brown pigment, which sometimes conceals the reticulated surface; and sometimes with a plain yellowish white immaculate one. The shell within is very often of a dark reddish-brown colour, with the oral margin whitish; but the same part is sometimes entirely whitish.

4. T. **obligatus*. *Shell* suboval, not thickened; *whirls* five, transversely wrinkled, and longitudinally striated with obtuse slightly elevated lines; *spire* short, much shorter than the aperture; *suture* indented.

Length about one-third of an inch.

Greatest breadth about the same.

Inhabits Portland, Maine.

Cabinets of Messrs. Stone, Hyde and Say.

This species strongly resembles the preceding, but is distinguished by the elevated, obtuse, revolving lines, or acute impressed ones. The colours are greenish, olivaceous, or whitish, with darker, irregular, transverse lines or shades, and the throat is dark reddish-brown, the margin of the mouth whitish. It is very possible that it is only a variety of the preceding.

5. T. **vestita*. *Shell* conic, rather thin; *whirls*

about six, rounded, transversely wrinkled; *spire* as long as the aperture; *suture* deeply impressed.

Length two-fifths. Width more than three-tenths. Inhabits Maine.

Cabinets of Messrs. Stone, Hyde and Say.

We are indebted for this shell to Mr. Aaron Stone. It is commonly invested with a dirty greenish-white pigment, beneath which it is sometimes reticulated with abbreviated yellowish lines, on a brown or dusky ground.

SCALARIA, *Lam.*

SPECIES.

1. *S. *lineata*. *Shell* brownish, elongated, with about seven volutions; *costa* robust, obtuse, little elevated, and from seventeen to nineteen on the body whirl; *body whirl* with generally a blackish, more or less dilated line, which is nearly concealed on the volutions of the spire by the suture; margin of the mouth robust, white, more dilated at the columella base.

Length about half an inch.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

Very much resembles *Turbo clathratulus* of Montague, which is figured by Maton and Rackett as a variety of *T. Clathrus*, (Trans. Lin. Soc. Lond. vol. 8. pl. 5. fig. 1.) but the lip is more robust, and

the basal portion of that part is more dilated than the quoted figure of that species. It is possible, however, that it is only a variety of that species.

TURRITELLA, Lam.

SPECIES.

1. *T. *alternata*. *Shell* dusky; acute at the apex; *volutions* eight, with about eight unequal, revolving, slightly elevated lines, which are maculated with rufous, and decussated by transverse, elevated, obtuse lines, which are obsolete below the middle of the body whirl and prominent on the spine; *labrum* not thickened, a slight indentation at its base. re

Length one-fifth of an inch.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

ANIMAL—*Foot* longer than the aperture of the shell, rather acute behind, and truncated a little convexly before; *tentacula* filiform, cylindrical, obtuse at tip, nearly as long as the foot, white, annulate with brownish lines; *eye* at the external base of the tentacula, not prominent; *rostrum* about one-third the length of the tentacula; *operculum* blackish.

The shell when taken from the water, becomes whitish-cinereous. They abound amongst *Fucus*, and sometimes on the shell of *Limulus Polyphemus*. The animal considerably resembles that of *Melania Virginica* as respects form, and, in common with

many fresh water shells, it possesses the power of gliding along the surface of the water, with the shell downward.

This shell is somewhat like *T. reticulata*, but the sculpture is less profound, and it has never any appearance of varices, or incrassation of the labrum.

2. *T. *impressa*. Shell dusky, acute at the apex; volutions six, with about four acute, impressed revolving lines; labrum not thickened, a slight indentation at its base, and a projecting angle within on its middle.

Inhabits the coast of Maryland.

Length more than one-eighth of an inch.

I have seen but two specimens of this species. The aperture is precisely similar to that of the preceding species.

3. *T. *bisuturalis*. Shell thin, pellucid, small, conic; whorls five, wrinkles almost obsolete, a revolving impressed line near the suture; suture not deeply impressed; spire gradually tapering, rather longer than the aperture; aperture rounded at base, and perfectly entire.

Length rather more than one-tenth of an inch.

Inhabits Boston harbour.

My cabinet.

I am indebted to Mr. Aaron Stone, for this small species of *Turritella*. It is distinguished from all others that I have seen, by the single impressed line, which revolves near the suture.

BULLA.

SPECIES.

B. *solitaria. *Shell* remarkably thin and fragile, pellucid, oval, narrowed at base, with numerous impressed revolving lines, and transverse very obtuse wrinkles; *aperture* surpassing the tip of the shell; *spire* none, substituted by an umbilicus; *umbilicus* of the base none.

Less than half an inch.

Inhabits the southern coast of the United States.

I found a specimen of this species of *Bulla* on the coast of Maryland, but have not seen another. It is probable that it is rare. It approximates to the description of *B. hydatis*, but it can hardly be the same, as it is more oblong than the species *B. naucum*, agreeably to the figure in the *Encyc. Meth.*, which species is referred to by Dillwyn, as being of the same form with *hydatis*.

MELAMPUS, *Montf.*

SPECIES.

M. *bidentatus. *Shell* thin, fragile, dirty-brownish; very little elevated, obtuse; *body whirl* with minute transverse wrinkles, and revolving impressed striæ; *labium* bidentate, the superior tooth transverse, prominent, placed below the middle, the other oblique, less prominent, terminating at the exterior edge of the columella; *labrum* with four or five ele-

vated striæ, not attaining the edge; *base* not contracted.

Length nine-twentieths of an inch.

ANIMAL—about as long as the shell, and the foot is transversely bifid; *tentacula* somewhat wrinkled, cylindrical, rather smaller towards the tips, which are obtuse or rounded; *eyes* placed at the inner base of the *tentacula*; *rostrum* somewhat wrinkled, nearly as long as the *tentacula*, bilobate before; *foot*, anterior segment emarginate behind, posterior segment bifid at the extremity; all above, with the exception of the *tentacula* and *rostrum* glabrous, reddish-brown, beneath paler.

Inhabits East Florida.

Cabinet of the Academy and Philadelphia Museum.

Var. a. With three or four fuscous revolving lines; base of the aperture narrower than in the species.

Length seven-twentieths of an inch.

Inhabits the coast of Maryland and New Jersey.

These shells inhabit the salt marshes, and have the habit of crawling up the culms of grasses, and other plants. I observed them to be very numerous near the mouth of St. John's river. It is sufficiently distinct from the *M. coniformis* by the paucity of striæ on the labrum.

The *variety* is a very common inhabitant of our coast, and is very possibly a distinct species, as it is lineated and is narrower at base; if so, it may be called *lineatus*.

Great numbers of this species are devoured by the dusky duck (*Anas obscura*,) and perhaps by other birds.

NATICA, Lam.

SPECIES.

1. N. **duplicata*. Shell thick, sub-globose, cinereous, with a black line revolving on the spire above the suture, and becoming gradually diluted, dilated, and obsolete in its course; within brownish-livid; a large incrassated callous of the same colour extends beyond the columella, and nearly covers the umbilicus from above; *umbilicus* with a profound sulcus or duplication.

Greatest length about two inches. Greatest breadth rather more.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

Very numerous upon almost the whole extent of our coast. The spire in some specimens is much more elevated than in others, and the duplication within the umbilicus, is sometimes partially concealed by the projecting callous.

In the collection of the Academy of Natural Sciences, is a species from Candia, presented by Mr. S. Hazard, which very much resembles this, but it differs in being destitute of the black line, and in having the umbilicus partially covered from the side, leaving only a linear, semicircular, lateral opening. Another specimen from India strongly resembles it, and is

also marked with the black line, but there is only a circumscribed callous extending laterally, leaving a large umbilicus, and marked transversely by a groove.

I formerly referred this species to *N. rugosa*, but it appears to be a much larger species, as Dillwyn states the *rugosa* to be only ten lines long. It is probably the same species as that represented by Lister on plates 562 and 563, but I do not find those figures referred to at all by Dillwyn.

2. *N. *heros*. *Shell* suboval, thick, rufo-cinereous; *within* whitish; *columella* incrassated; *callous* not continued over the upper part of the umbilicus, hardly extending beyond a line drawn from the base of the columella to the superior angle of the labrum; *umbilicus* free, simple.

Length about two inches and a half.

Inhabits the coast of New Jersey.

I have two specimens from Great Egg Harbour. It differs from the preceding species in being less dilated, destitute of the black line of the apex, and of the much incrassated projection from the columella so conspicuous in that shell. This is our largest species. I have a specimen more than three inches in length.

I formerly considered this to be the *N. rufa*, Gmel. but that species is said by Dillwyn to be only half an inch or an inch long, and he refers to Born. t. 17, f. 3, and 4, and also to Lister, Conch. t. 506, f. 3, neither of which figures resemble our species.

On a new locality of the Automalite. By LARDNER VANUXEM. Read July 16, 1822.

Among the many various and interesting minerals which are presented to us by the new and prolific locality of Franklin, in Sussex county, New Jersey, is the Automalite, or *Spinelle Zincifere* of the Abbé Haüy, a mineral hitherto confined to Uto in Sweden, and which is there found imbedded in talcous rocks.

The Automalite of Franklin was discovered in August 1821, by William H. Keating, Esq. and myself. It occurs in crystals presenting its primitive form, the regular octahedron, with all its edges emarginated; in size it varies from microscopic to two-thirds of an inch in length. Its colour is of a beautiful dark green, usually translucent and sometimes almost transparent. With borax it fuses before the blowpipe, forming a yellow glass when hot, which on cooling changes to a beautiful and permanent violet; this colour is due to the oxide of manganese, which gives to the mineral its green colour. This action with the blowpipe is analagous to that of the Swedish Automalite. Its hardness is the same as that of the Swedish. Instead of being accompanied by talc as in Sweden, it is found at Franklin with quartz, feldspar, Jeffersonite, silico calcareous oxide of titanium, &c.

In order to ascertain that this mineral was really a Zinciferous Spinelle, it was chemically examined in the following manner: the quantity operated on

being too small for an analysis, in which the proportions are to be determined.

It was first reduced to an impalpable powder, then boiled for several hours in sulphuric acid, which exerted a considerable action upon it; the soluble part was then separated from the insoluble by filtering. To the soluble part, ammonia was added in great excess, and the solution filtered. The precipitate was tinged with a yellow colour, produced by oxide of iron. It formed alum with sulphuric acid and potash, and hence contained alumine. The ammoniacal liquor by evaporation threw down a white substance, soluble in ammonia, precipitable when the excess of ammonia was saturated by an acid, and in short presenting all the characters of oxide of zinc.

NOTE—After the foregoing account of the Automalite had been sent to the Academy, I met with the second number of the New York Medical and Physical Journal, containing Thomas Nuttall, Esq's. "Geological and Mineralogical Remarks on the Minerals of Patterson, and on the valley of Sparta," in which I find he notices the Automalite of Franklin, under the synonyme of Gabnite. The only difference between his description and my own of sufficient importance to be noticed, is his having observed that the edges of one of the basis of the octahedrons is more commonly truncated than the other basis, a fact all important in the consideration of crystals, as presenting an anomaly not hitherto observed in the regular octahedron, and which would in itself have

been sufficient to induce the author to believe that this mineral was not Gahnite, but a substance, whose primitive form was an octahedron, with angles approaching those of the regular octahedron of geometry.

Description of three new Species of the Genus Sciæna. By C. A. LESUEUR. Read July 26, 1822.

In the month of July, 1816, we observed a great number of fish, abandoned by the fishermen, on the shores of Lake Erie. They were very well preserved in their exterior form; the viscera being destroyed by insects, and the remainder dried in the sun: but as they had been rolled on the beach by the waves, their fins broken and in part destroyed, we could only decide upon their belonging to the genus *Sciæna*, a decision which was confirmed a few days afterwards, by the examination of many living individuals that had been taken in the lake. There, as well as at Pittsburg, they are known by the name of sheeps-head; and although the individuals taken at Lake Erie, were closely related to those of the Ohio which we observed on our journey to Pittsburg, yet I have observed such differences between them, as have induced me to offer a particular description of each; they may, however, be only varieties.

Those of the lake are not esteemed as food, if we may judge by their being rejected by the fishermen; this circumstance, however, may only prove the fish to have been then out of season.

Those of the Ohio are brought to the table, and are much fatter, living in the muddy water of that river, which seems to be more favourable, by affording a greater proportion of nourishment, than the clear, limpid water of Lake Erie.

These fish seem to attain a much larger size than that of the specimens we observed, of which the total length was not more than from fourteen to sixteen inches.

They are taken by the seine, and hook and line, and are salted, when other species are less abundant.

SCIÆNA.

1. *S. *oscula*. Second dorsal long, elevated, equal; tail short; neck prominent; scales soft.

Body subeliptic, compressed towards the back, broader at the abdomen; back elevated rectilinear; *head* much declining; *snout* small, rounded, a little prominent, with three small openings at the end; *mouth* very small, horizontal, having the superior maxillaries and the inferior jaws concealed under the inferior corners of the nostrils; teeth very small, conic, the exterior series a little stronger, those of the throat rude, obtuse, placed upon a triangular bone, the strongest being in the middle, and the weakest on the sides, and upon two bones separately placed at the superior part of the throat; the *eye* is round, placed near the end of the snout, and very near the summit of the head; *preoperculum* larger

than the operculum, with serratures hardly sensible on the preoperculum, the other pieces being destitute of spines; *dorsal fins* subequal in height, the first rounded anteriorly, and lower towards the three last rays, all of which are strong and spinous, and imbricated to lay close upon the back; the second dorsal is very high and equal in its length, sustained by from twenty-nine to thirty soft and much divided rays, of which the first is spinous; the base of the rays of this fin, and of the caudal, are covered with scales; *pectorals* moderately pointed; *thoracic fins* armed with a strong spinous ray; *anal* moderate, of seven divided rays and two spines, of which the first is very short, the second strong and very long; *caudal* subtruncated, wider than the abdomen; *scales* oblique, shorter than broad, and slightly denticulated, without being rough to the touch, crowded towards the neck above the pectorals, larger upon the opercula, the sides of the body, and upon the tail; the *colour* on the head, snout, and caudal fin was of a bluish-gray, drawing upon black upon the snout and above the eyes, more gray towards the back, and above the pectorals; all the other fins are of a lighter gray; there were some red tints upon the cheeks, a yellowish reflection upon the scales of the back of the tail, and of the opercula; the abdomen beneath the throat was white; *lateral line* arquated.

Length sixteen inches, by about four inches and a half in depth.

B. 7. P. 19. D. 9.—30. T. 1—5. A. 2—7. C. 18 5-5.

This species inhabits Lake Erie.

2. *S. *grisea*. Second dorsal long, low anteriorly, elevated and rounded posteriorly; scales rough; a slight frontal depression.

Inhabits the Ohio.

Body elliptic, attenuated at the two extremities, elevated on the neck and on the back; *head* small, pointed; *snout* a little prominent, round; opening of the *mouth* small; *jaws* unequal, the inferior one smaller, closing within the superior; many pores beneath the inferior one and at the tip; maxillaries and intermaxillaries in these two species covered by the inferior corner of the nostrils; *teeth* very small and short in the jaw, very strong, round and obtuse at the opening of the throat, and placed upon a triangular bone, furnished with two large and inferior apophyses, for the attachment of the muscles; to these teeth there are others which correspond with them, and are grouped upon two separate bones placed superiorly and at the opening of the throat; *eye* round, large, near the summit of the head; iris black above and silvery below; no spine upon the operculum, the denticulations of the preoperculum and interoperculum are hardly sensible; *pectoral fins* falciform, placed a little before the thoracic fins; *thoracic fins* armed with a strong bony ray; *anal* small, pointed, subtriangular, having two strong bony rays anteriorly, of which the first is very short; this fin is smaller than that of the *oscula*, and more distant from the end of the tail; *caudal* subtruncated; *scales* broader than long, border rounded, denticulated; larger upon the sides, the abdomen and the back, than upon the

neck and above the pectorals, where they are crowded; the head, the opercula, and the snout are covered with scales, which are not detached like those of the sides of the body; the base of the second dorsal and of the caudal are scaly between the rays; *lateral line* curved above the pectorals, straight and oblique towards the anal; *colour* of the head, back, tail and fins grayish-silvery-blue; abdomen white on the thoracics, the anal, at the base of the pectorals and upon the opercula.

B. 6.—P. 16.—D. 9.—33.—T. 1.—5.—A. 2.—8.—C. 19 4-4.

This species arrives at a considerable magnitude; the individuals we examined measured from 18 to 24 inches in total length.

3. *S. multifasciata*. Dorsal very long, emarginate, anterior part high, triangular, posterior part very low, long, equal, and half the height of the anterior portion; 15 to 16 narrow, oblique, cinerous bands.

Inhabits East Florida.

Body compressed, subeliptic, elongated; *head* arquated; *back* slightly arquated; no teeth upon the preoperculum, or spines upon the operculum; *pectorals* and *thoracics* pointed; *anal* quadrangular; *caudal* lunulated; *dorsal*, anterior part a little before the pectorals; *eye* round, large, distant from the front; *jaws* subequal, the opening of the mouth large, horizontal, the angle not extending beyond the eye; *teeth* very small, like those of cards; *snout* obtuse,

not prominent ; the operculum, snout and head covered with thin scales, upon the sides of the body they are oblique, small and crowded towards the neck, and large towards the abdomen ; the base of the pectorals and of the anal are furnished between the rays with scales ; *lateral line* slightly arquated at its origin ; *colour* in general golden-yellow, traversed by narrow undulated bands of a bluish tint ; these bands originate at the back, and descend obliquely forward, they become more perpendicular towards the tail ; anal, caudal, and thoracics red at base ; the dorsal lightly and delicately ornamented with a red band, orange at the base of the rays ; the remainder of the membrane of all the other fins, appears to have been bluish, and like the anal irrorate with black points.

B.—P. 20.—D. 9.—30.—T. 6.—A. 2.—11.—C. 17.

This individual was communicated to me, by Messrs. Maclure, Ord, Say and Peale, who brought it among their collections from Florida, in the dried state.

August 1822

*An account of some of the Marine Shells of the
United States.* By THOMAS SAY.

[CONTINUED FROM PAGE 248.]

3. **pusilla*. Shell thin, suboval, cinereous or rufous, with sometimes one or two obsolete, dilated, revolving bands; *columella* callous; *callus* pressed laterally into the umbilicus, whitish; *umbilicus* nearly closed and consisting only of an arquated, linear, vertical aperture.

Length about a quarter of an inch.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

A small species, generally mistaken for the young of one of the preceding species.

THEODOXUS, *Montf.*

SPECIES.

N. **reclivatus*. Shell thick, strong, globose-oval, greenish-olive, with numerous, approximate, parallel, irregularly undulated green lines across the volutions; *volutions* about three, the exterior one occupying nearly the whole shell; *spire* very short, obtuse at the apex, and frequently eroded to a level with the superior edge of the body whirl; *mouth* within bluish-white; *labrum* acutely edged; *labium* callous, minutely crenated on the edge, and with a very small tooth near the middle.

Greatest diameter nineteen-twentieths of an inch, greatest transverse diameter four-fifths of an inch.

Inhabits East Florida.

Cabinet of the Academy and Philadelphia Museum.

ANIMAL—pale, more or less distinctly lineated, or clouded with black; *foot* rounded, almost orbicular, hardly as long as the shell is broad; above with four more or less distinct, black, parallel lines; *rostrum* dilated, truncated, tip with four black lines, a black band connecting the eyes; *eyes* prominent, appearing to be placed on a tubercle at the outer base of the tentacula, black with a white orbit; *tentacula* with darker or black lines, setaceous, and longer than the breadth of the rostrum; *beneath* immaculate.

I found this species in great plenty, inhabiting St. John's river in East Florida, from its mouth to Fort Picolata, a distance of one hundred miles, where the water was potable. It seemed to exist equally well, where the water was as salt as that of the ocean, and where the intermixture of that condiment, could not be detected by the taste. Its movements are remarkably slow.

CLASS,

CONCHIFERA.

OSTREA, *Lin. Lam.*

O. **semicylindrica*. *Shell* elongated, semicylindric, white, covered with a fuscous epidermis; sides parallel; base and tip rounded, equally obtuse; *inferior* valve very convex; *superior* valve flat; *within* white, somewhat perlaceous; *muscular impression* large, white.

Length seven-twentieths of an inch.

Inhabits the coast of Georgia and Florida, imbedded in sponges.

Cabinet of the Academy and Philadelphia Museum.

This species has the habit and manners of the genus *Vulcella*, but differs from it in having very unequal valves and beaks, and at the same time it differs from the *Ostreas* in being unattached. I found several specimens imbedded in sponges, or interposed between a large *Ascidia* and our common *Thethya*, Lam.

PECTEN, Lam.

1. P. **concentricus*. Shell suborbicular, with from eighteen to twenty elevated, rounded ribs, and very numerous simple transverse wrinkles; longitudinal striæ, none; one valve somewhat ventricose, pale-yellow, fasciated concentrically with reddish-fuscos or blackish; the other valve convex, brownish-cinereous; *auricles* subequal; *hinge margin* rectilinear in each valve; *within* white.

Length two inches and nine-tenths.

Breadth three inches and one-tenth.

Inhabits the coast of New Jersey.

Var. a. Somewhat more compressed, variegated.

Cabinet of the Academy and Philadelphia Museum, and Mr. Hyde's collection.

Although this shell is a large species, and is one of our most common shells, yet I cannot perceive that

it has been either figured or described distinctly in any work to which I can refer. The inner margin, particularly between the ribs, is sometimes of a dirty reddish-brown colour. I have not seen this species on the southern coast.

The variety occurs on the coast of New England, and several specimens are preserved in Mr. William Hyde's cabinet. One specimen is of a fine bright orange-colour, and on one of the valves only, are the concentric bands of blackish; the margins, which decline from the beaks, are transversely mottled with white. Another has one valve blackish-brown, with about a dozen rather large white spots on the disk, longitudinally disposed, and white transverse variegations on the umbones and beaks; the margins, which decline from the beaks in both valves, are similarly coloured, and varied with transverse white marks; the opposite valve is yellowish-white, with the usual bands. It must, however, be observed, that the epidermis of both these specimens was removed by muriatic acid. It is probable that the examination of numerous specimens, will prove this to be a distinct species, if so, it may be distinguished by the name of *P. borealis*.

2. *P. *dislocatus*. Shell suborbicular, with twenty or twenty-two elevated rounded ribs, and very numerous concentric wrinkles; longitudinal striae none; whitish tinged with yellow or reddish, with a few narrow, transverse, interrupted, and dislocated, sanguineous, undulated lines, and five or six pale-

reddish, almost obsolete spots, on the margin, at the base of the auricles ; *auricles* subequal ; *hinge margin* rectilinear in each valve.

Length one inch and a half.

Breadth one inch and three-fifths.

My Cabinet.

This is a very pretty species, and seems to be confined to the southern coast, where it is rare. It is very different in its coloured markings from the preceding species, which, however, it much resembles in form. I have a young specimen, on which the red lines are numerous, but are dilated, pale, and tinted with dull purplish.

PANDORA, Brug.

SPECIES.

*P. *trilineata.* *Shell* white, subpellucid, concentrically wrinkled ; *hinge* placed at the posterior slope, which is very abrupt, and forming a very considerably obtuse angle with the hinge margin ; *hinge margin* concavely much arquated, the surface flattened, and bounded on its edges by two elevated approximate lines, originating at the beak and continued to the tip, which is rostrated ; rostrum ascending ; a distinct slightly impressed line originates at the beaks, and passes to the middle of the basal margin ; *right valve* a little convex ; *left valve* flat.

Length nine-twentieths of an inch.

Greatest breadth nineteen-twentieths of an inch.

Inhabits the American coast.

Cabinet of the Academy and Philadelphia Museum.

I first discovered a single valve of this curious shell several years ago at Great Egg Harbour, on the shores of New Jersey ; since which, I have found two or three others on the coast of Georgia and East Florida, so that it may be said to inhabit our whole southern and middle coast. The inner edge of the hinge margin of one valve, closes over that of the other. This species is very different from the *P. inequivalvis*, particularly in having the hinge placed much further back, and consisting of a mere angle, not prominent ; the rostrum also has a direction more upward.

AVICULA, Brug.

SPECIES.

A. hirudo. Var. Shell perlaceous; epidermis reddish-brown, with very numerous undulated wrinkles, which are disposed in radii, and rendered more conspicuous by a white longitudinal line at the junction of each series of wrinkles with its contiguous one.

Width about three-fourths of an inch.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

It appears to be rare. I have found but a single entire specimen, which is young. In its radiating

series of wrinkles, it approximates to *A. morio* of Leach, but differs from it in magnitude, and in being radiated with whitish lines. I have a specimen from the West Indies, which corresponds very well with this, but as it is a much older shell, it is of a much darker colour, and the radi are interrupted into abbreviated lines.

A valve of an adult shell, also occurred on the southern coast, but so much worn by attrition, that its superficial characters are destroyed.

MYTILLUS, *Lin. Lam.*

SPECIES.

1. *M. *cubitus*. *Shell* oblong, striated with elevated, subglabrous lines, which are smaller on the anterior side; *anterior edge* linear, or slightly concave; *posterior edge* ascending from the base in a right line to a prominent angle, which is rather behind the middle of the shell, from which it descends by a concave line to the obliquely and very obtusely rounded tip; *colour* yellowish, polished and somewhat fasciated with green or brownish, which disappear on the anterior margin.

Length one and one-fifth of an inch.

Breadth half an inch.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

This species, seems to be most closely allied to

M. demissus and *exustus* ; from the former it is distinguished, by not having the angle on the posterior side obtusely rounded, and not placed considerably before the middle ; and the line of the edge before this angle, is not convex as in that shell. It does not at all correspond with the figures in the Encyc. Method. which are quoted for *exustus* ; but it agrees very well, and is probably specifically the same, with the species represented on plate 365 of Lister's conch. which the author thus defines "*musculus parvus, subluteus, leviter striatus.*"

2. M. **lateralis*. Shell transversely suboval, inflated, subpellucid, with numerous concentric wrinkles, anterior and posterior margins, longitudinally ribbed with alternate large and small lines, which crenate the basal margin ; intermediate area destitute of longitudinal lines ; most prominent part of the shell extending from the beak to the tip of the anterior margin, and bounded on its posterior side by an indented line ; *epidermis* pale-brownish.

Length three-tenths of an inch.

Breadth eleven-twentieths of an inch.

Thickness seven-twentieths of an inch.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

Found imbedded in the large *Tethya* of our coast. This shell is closely allied to *Mytillus discors* of Montague.

3. *M. *hamatus*. *Shell* very much contracted and incurved at the base, which is acute; *valves* striated on every part of the exterior with longitudinal, elevated lines, which are bifid and sometimes trifid towards the tip; *colour* dark fuscous; *within* dark purpurescent, with a whitish margin.

Length one and one-fifth of an inch.

Breadth nearly four-fifths of an inch.

Inhabits the Gulf of Mexico.

Cabinet of the Academy and Philadelphia Museum.

A common species in the Gulf of Mexico, and is frequently carried to market at New Orleans, attached to the common oyster. It is remarkably distinct from *M. demissus* by the great incurvature of the beaks, by its inferiority in magnitude, and by having the striæ extending over every part of the surface of the shell.

I cannot refer it to *striatulus*, with which it seems to have some affinity, as that species is described to be nearly diaphanous. It seems to have some affinity with the *M. decussatus* Lam. but is much smaller, and the transverse striæ are not very prominent.

MODIOLA, Lam.

SPECIES.

1. *M. Americana*. *Var.* *Shell* oblong, *hinge margin* elevated in a right line, from the beak to the

alated angle, from which it declines also in a right line, nearly to an equal distance; alated projection rounded; *anterior margin* short and small; *basal margin* with a dilated but slightly impressed contraction in the middle; *epidermis* transversely wrinkled, light-brown, the raised oblique portion of the shell yellowish-white; *cortex* with membranous scales and filiments, and covering all the anterior portion of the shell to the beak.

Modiola Americana, Leach Zool. Misc. vol. 2. pl. 72. fig. 1. *Var.*

Inhabits the southern coast.

Length, from the tip of the angle to the middle of the base, three-fifths of an inch nearly.

Breadth one and one-fifth of an inch.

Thickness half an inch.

Cabinet of the Academy and Philadelphia Museum.

This variety differs from that figured by Dr. Leach, in being always destitute of oblique coloured radii.

2. *M. *castanea*. *Shell* transversely oblong sub-oval; *hinge margin* elevated in a right line from the beak to the alated angle, from which it declines in a line slightly arquated; alated angle rounded; *anterior margin* rounded at the tip; *posterior margin* rather large; *base* with a dilated but slightly impressed contraction before the middle; *epidermis* concentrically wrinkled, castaneous; *cortex* not continued behind the middle of the shell; *within* bluish.

Inhabits the southern coast.

Length, from the tip of the angle to the middle of the base, three-fifths of an inch.

Breadth one and one-tenth of an inch.

Thickness nearly half an inch.

Cabinet of the Academy and Philadelphia Museum.

This species, like the preceding, is furnished with a membranaceous expansion over a portion of the epidermis, giving rise to a number of filamentous processes, by means of which the shell is attached to various marine bodies.

ARCA, *Lin. Lam.*

1. A. **ponderosa*. *Shell* somewhat oblique, very thick and ponderous, with from twenty-five to twenty-eight ribs, each marked by an impressed line; interstitial spaces equal to the width of the ribs; *umbones* very prominent; *apices* remote from each other, and opposite to the middle of the hinge, spaces between them with longitudinal lines as prominent as their corresponding teeth; *anterior margin* cordate, flattened, distinguished from the disk by an abrupt angular ridge; *posterior edge* rounded, very short; *inferior edge* nearly rectilinear, or contracted in the middle.

Length two inches and one-eighth.

Greatest breadth two inches and a half nearly.

Inhabits the southern coast.

My cabinet.

A remarkable species and readily recognised.

2. A. **pexata*. *Shell* covered with a hairy epidermis, transversely subovate, with from thirty-two to thirty-six ribs, placed nearer to each other than the length of their own diameters; *umbones* moderate; *apices* approximate, placed far backward, very near the posterior termination of the hinge; *posterior edge* rounded, destitute of an angle; *anterior edge* rounded, with an angle at the termination of the hinge; *inferior edge* regularly rounded.

Length one inch and seven-tenths.

Breadth two inches and three-tenths.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

A common species, distinguished by the name of the *bloody clam*. It is covered with a hairy epidermis, and when violently opened, an effusion of a red sanies proceeds from the animal. In the young shell, an angle is perceptible on the posterior edge, at the termination of the hinge margin, but this disappears with age.

3. A. **incongrua*. *Shell* somewhat rhomboidal, with from twenty-six to twenty-eight ribs, placed nearer to each other than the length of their own diameters, and crossed by elevated, obtuse, equal, and equidistant lines, which are altogether wanting on ten rays of the disk of the left valve; *apices* opposite to the middle of the hinge, distant from each other, with a lanceolate space between them, of which the breadth is about one-third of its length; extremities

of the hinge margin angulated; *posterior edge* rounded; *inferior edge* rounded, that of the light valve extended a little beyond the regular curve in the middle; *anterior margin* cordate, flattened; *anterior edge* nearly rectilinear.

Length two inches.

Breadth rather more than two inches.

Inhabits the estuaries of the United States.

Cabinet of the Academy and Philadelphia Museum.

This species, which is very abundant on our coast, strongly resembles *A. rhombea*, but, agreeably to the figure in the Encyc. Meth., it differs in the width of the space on the hinge margin, in the width of the spaces between the ribs, and in its more rectilinear anterior edge.

4. *A. *transversa*. *Shell* transversely oblong, rhomboidal, with from thirty-two to thirty-five ribs, placed at nearly the length of their own diameters distant from each other; *apices* separated by a long narrow space, and situate at the termination of the posterior third of the length of the hinge margin; extremities of the hinge margin angulated; *anterior edge*, superior moiety rectilinear; *posterior edge* rounded; *inferior edge* nearly rectilinear, or very obtusely rounded; on the hinge space one or two angulated lines are drawn from the apex, diverging to the hinge edge.

Length less than seven-twentieths of an inch.

Breadth one inch and one-fifth.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

This species, which is abundant in some districts, is remarkable by its transverse form, and may be known among the foregoing species, by the apex being situate opposite to one-third of the distance from the posterior termination of the hinge margin.

NUCULA, *Lam.*

SPECIES.

*N. *proxima.* *Shell* subtriangular, oblique, concentrically wrinkled, and longitudinally marked with numerous, hardly perceptible striæ; *posterior margin* very short and very obtusely rounded, a submarginal impressed line; *anterior margin* very oblique, and but slightly arquated; *umbo* placed far back; *within* perlaceous, polished, edge strongly crenated; *teeth* of the hinge robust, the posterior series very distinct and regular.

Greatest length, parallel with the posterior margin, three-tenths of an inch.

Breadth less than two-fifths of an inch.

Inhabits the southern coast.

Cabinet of the Academy.

Very much resembles *N. nucleus*, but is proportionally wider, and the posterior series of teeth is more regular and distinct. It may possibly prove to be only a variety, when numerous specimens are carefully examined and compared.

VENUS, *L. Lam.*

1. *V. *notata*. *Shell* obtusely rounded before, and with a slight undulation on the anterior margin; *disk* nearly destitute of the elevated concentric striae which mark the borders of the shell, and distinguished by rufous zigzag transverse lines; *within* yellowish-white.

Breadth about three inches.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum, and Mr. Wm. Hyde's collection.

A rare species called the *lettered clam*. I obtained one specimen at Great Egg Harbour, and another on the coast of Georgia. Mr. Hyde received his specimen from New England; it has the rufous lines very much dilated, but they still preserve the zigzag form.

2. *V. *præparca*. *Shell* subovate, with numerous, elevated, subacute, parallel, concentric lines, which subside into mere wrinkles near the suture of the ligature slope, interstitial spaces plain; *ligament slope* flattened, margined by an acute line; *anterior margin* with an obsolete, longitudinal, very obtuse undulation, which gives the tip of this margin a slightly truncated appearance; *areola* cordate, elevated at the suture; *within* white or yellowish; *inferior* and *posterior* margins within crenulated, the crenulæ extending along the edge of the areola to the beak; in

advance of the anterior termination of the ligament groove of the left valve, is another distinct groove which receives the edge of the corresponding margin of the other valve.

Width two inches and one-fourth.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

This species bears considerable resemblance to *V. Casina*, but that shell is regularly arquated on the anterior margin in Maton and Rackett's figure (v. Trans. Lin. Soc. Lond. 8. pl. 2. fig. 1.) It also approaches *V. rigida*, but is distinct by its cordate areola, &c.

3. **elevata*. *Shell* subcordate, longitudinally sulcated, sulci equal, numerous, dense, on the anterior submargin sparse; concentric elevated, remote, lammelar bands; *anterior margin* subangulated at tip; *within*, margin crenated, crenæ obsolete on the anterior margin, and near the hinge on the posterior margin.

Length four-fifths of an inch.

Breadth nine-tenths of an inch.

Inhabits the southern coast.

Cabinet of the Academy.

I obtained but a single bleached valve of this species. It certainly approaches very near to *V. cancellata*, but it is distinguished by being much less obtuse before, and by having the longitudinal striæ more numerous. The concentric lammelar bands were eleven in number on this specimen.

4. V. **inequalis*. *Shell* subcordate, longitudinally sulcated, lines numerous, obsolete on the anterior margin, behind the middle bifid and alternating with smaller single ones; concentric, distant, lamellar bands, but little more elevated than the longitudinal lines; *anterior margin* subangulated: *within*, margin crenate, crenæ obsolete on the anterior margin and rear; the hinge on the posterior margin.

Length one inch.

Breadth one inch and one-fifth.

Inhabits the coast of the middle states.

Cabinet of the Academy and Philadelphia Museum.

Very similar in form to the preceding, but it is distinguishable by the much less elevated and more numerous bands, and by the bifid, unequal and less numerous longitudinal lines. I have only found them on the coasts of New Jersey and Maryland.

5. V. **castanea*. *Shell* thick and ponderous, suborbicular, or subtriangular, with prominent and nearly central beaks; *lunule* excavated, lanceolate; *cartilage slope* rectilinear, indented; *valves* with minute concentric wrinkles, and larger waves; *epidermis* chesnut-brown, with darker or paler zones; *within* white, the margin very regularly crenulated.

Length one inch.

Breadth one inch nearly.

Inhabits the coast of New Jersey.

Cabinet of the Academy and Philadelphia Museum.

A very thick shell, not unfrequent on the coast at Great Egg Harbour. The surface is often sculptured with very slightly elevated, obtuse lines, which are sometimes elevated and acute; it very closely approximates to *Venus sulcata* as figured by Maton and Rackett, Trans. Lin. Soc. Lond. vol. 8. pl. 2.

CYTHEREA, Lam.

C. **occulta*. Shell suborbicular, or subtriangular, thick, with very numerous approximate, obtuse, transverse and longitudinal, elevated lines, which are nearer to each other than the length of their own diameters, the longitudinal ones not being visible to the unassisted eye; *lunule* destitute of the longitudinal lines; *colour* yellowish-white with a few large brown spots, *lunule* and *ligament* slope transversely spotted with reddish-brown; *margin* within entire; *anterior cardinal tooth* simple.

Length and breadth half an inch.

Inhabits the southern shores.

Cabinet of the Academy and Philadelphia Museum.

This shell is very rare, and is not to be mistaken for any other shell which I have seen on our coast. The aid of a magnifier is necessary to discover the longitudinal lines.

TELLINA, *Lin.*

SPECIES.

1. T. **alternata*. *Shell* compressed, oblong, narrowed and angulated before, white ; numerous parallel, equal, equidistant, impressed concentric lines, which on the anterior margin are alternately obsolete ; interstitial spaces flat ; *within* tinged with yellow, a callous line, which is sometimes obsolete, passes from behind the hinge to the inner margin of the posterior cicatrix, and another from before the hinge to the inner margin of the anterior cicatrix ; anterior hinge tooth emarginate ; posterior lamellar tooth very near the cardinal teeth, so as to appear like a primary tooth, that of the right valve wanting ; anterior lamellar tooth at the extremity of the ligament ; *anterior hinge slope* declining in a somewhat concave line to an obliquely truncated tip.

Length one inch and one-fourth.

Width two inches and one-fifth.

Thickness two-fifths of an inch.

Inhabits the coast of Georgia and East Florida.

Cabinet of the Academy and Philadelphia Museum.

Rather a common shell, beautifully and very regularly striated. When cast upon the beach, one of the valves is very commonly perforated near the hinge ; this operation, it would seem, is most frequently performed upon the left valve, as, of ten

specimens thus mutilated, I have but two with the perforation upon the right valve. It varies in being destitute of the yellow colour within. It is probably allied to *T. punicea*, but I have never found it so far north as the coast of New Jersey. It is much more elongated than the latter, the striæ are far more distinct, and it is entirely and always destitute of the rose-coloured bands, and lines, such as are represented in Born's figure of that shell. It cannot be the *T. angulosa* of Gmel., as that species is described to be suborbicular, and to have the lateral teeth remote, whereas the *alternata* has but one of the lateral teeth remote.

2. *T. *polita*. Shell transversely subtriangular, minutely wrinkled concentrically, white, immaculate; *anterior* margin rather shorter than the *posterior* one, the hinge slope declining, in a very slightly arquated line, to a subacute termination; *basal margin* nearly rectilinear from behind the middle to the anterior termination; a lateral tooth behind the primary teeth.

Length two-fifths of an inch.

Breadth thirteen-twentieths of an inch.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

Not unfrequent on the beach of South Carolina and East Florida.

On the Geology and Mineralogy of Franklin, in Sussex County, New Jersey. By LARDNER VAN-UXEM and WILLIAM H. KEATING. Read August 6, 1822.

In the communications which we have lately had the honour of reading to the Academy, we described two minerals which we had discovered at Franklin, Sussex County, New Jersey, during an interesting visit to that spot in the month of August, 1821. Of these minerals one was quite new, and to it we assigned the name of *Jeffersonite*. The other was a new variety of the Automalite (*Spinelle Zincifere*, Haüy,) a mineral which had not yet been found on this side of the Atlantic. We likewise noticed several other minerals, a more particular description of which we deferred until a further examination of the spot should enable us to present to the Academy a satisfactory account of the Geology and Mineralogy of that neighbourhood. We have lately accomplished this task, and our second visit to Franklin has afforded us objects of equal, if not greater, interest, than those which we had collected there last year.

The environs of Franklin appear to us calculated to interest equally the mineralogist and the metallurgist; to the latter they present the largest deposit of ores which is known to exist either in Europe or America. These ores, varied in their nature, but equal in quality, are accompanied by all that could assist in making them valuable. Not only has nature

endowed this spot with a most bountiful supply of ore, but she has enriched it with the materials required to turn it to the best advantage. She has supplied it with fluxes, fuel, water-powers, and all that could facilitate the working of these mines to any extent that might be wished. After a careful and attentive examination of this spot, and of the metallic deposits which it presents, we have no hesitation in stating it as our firm conviction, that as soon as these ores shall be made the object of operations, conducted on improved and scientific principles, they will immediately yield to their owners the most ample remuneration.

To the mineralogist Franklin affords not less interest. It has already furnished three new minerals, which have not as yet been met with elsewhere; the red zinc ore, the Franklinite and the Jeffersonite. The sequel of this paper will show that to this number one more is to be added, and that the whole number of minerals, which are met with here, amounts to about thirty, among which eight or ten present new varieties.

The geological features of this country are not less interesting, for it will be found from subsequent details, that it contains large beds of ore in a rock which is seldom very metalliferous; and that it presents us a spot, where formations of different ages may be observed in contact, and their mode of superposition determined with ease.

The attentive observer of the Franklin minerals will, we think, readily perceive that they present

characters which are generally considered to be peculiar to minerals which have been affected by a great heat.

Without pretending to account here for the cause of this interesting appearance, we merely state the fact, and proceed to lay before the Academy the result of our observations, which we shall divide into two parts. The first shall include the geological description of Franklin and its neighbourhood. The second shall contain an account of the minerals which are found at that locality. This second part we shall subdivide into two chapters. In the first we shall make known the new mineral species which we have discovered. In the second we shall give an account of the new varieties of mineral species found there.

PART FIRST.

REMARKS ON THE GEOLOGY OF FRANKLIN.

The Franklin iron works are situate in Sussex county, at about seven miles and a half to the north-east of Sparta, two miles south-west of Hamburgh, and eleven miles east of Newton or Sussex Court House. The works are located at the spot where the metalliferous ridge, which we propose to make the principal object of this description, is intersected by the valley, in which run the head-waters of the Wallkill, a stream which after swelling to a considerable size, empties itself into the Hudson, at Columbus.

The whole country to a great distance, is composed of what may be considered as sienite, having more analogy to that species of rock, than to any other hitherto described; this is, we think, the latest of the well crystallised formations of the primitive class; the only primitive rock of later formation being the clayslate. This constitutes the great sienite formation of our country, and appears to extend, so far as we have obtained information, from the Hudson* to Virginia. It is in many places covered by transition limestone and old red sandstone.

This sienite is composed of feldspar and amphibole in grains, which vary much in size, from microscopic particles to crystalline masses of several inches in diameter.

What particularly distinguishes this sienite from all others, is the frequency and abundance of quartz which is always in the hyaline state, and appears to form an essential constituent of this rock—occurring like the preceding minerals in various sized grains. The quartz is disseminated throughout this rock, without affecting any particular disposition, such as is observed in granite, for which it has often been mistaken. The relative proportions of the two first mentioned ingredients vary much; in some places,

* This formation appears upon the Hudson, at the upper part of the Haverstraw sea, and terminates about four miles above West Point, presenting a similar series of subordinate rocks, and also containing some of the same minerals, such as Chondrodite, Black Spinelle and Oxidule of Iron. The direction of the rock is North 20° East and its dip East 80°.

the feldspar, in others the amphibole predominates ; so that the rock presents all the shades which occur between the well characterized sienite, and the equally well characterized diabase or greenstone.

The sienite of Franklin is found in beds or layers of variable thickness, running in a direction parallel to that of the ridge, from the north-east to the south-west, consequently, parallel to the great Appalachian chain of mountains, extending from the southern part of the state of New York to Georgia. The layers or beds incline to the south-east dipping under an angle of about 80° . Subordinate to this sienite, are found limestone, gneiss and greenstone ; this latter being due of course to an accumulation of amphibole, and diminution of feldspar, and forming partial masses of no very great extent.

The limestone forms a bed, without any apparent parallel seams or divisions, and is peculiarly characterized by its eminently crystalline structure, consisting of large straight lamellar masses, confusedly aggregated, appearing to belong to the *equiaxe*, from the circumstance of its breaking into solids, which present not only the cleavages of the primitive form, but also those of this crystal ; the faces of the latter are not, however, so well defined as those of the former. It is of a fine white colour, presenting in some instances a pearly lustre, slightly chatoyant ; in short, a limestone admirably adapted to ornamental purposes, as a marble, for which at some future time it will be used, notwithstanding the difficulty of obtaining it in layers or plates.

The direction, inclination and dip of this limestone are the same as those of the aforementioned sienite. It has been traced upon a distance of about eight miles, with few or no interruptions, to wit: from Sparta at the south-west to one mile beyond Franklin to the north-east, and even as far as Hamburgh, as we were informed; although this limestone is subordinate to the sienite, still masses of sienite are found in it. We shall have occasion to refer to these masses when we come to speak of the minerals found in that vicinity.

From the great abundance and importance of the metallic deposits which occur in the sienite of Franklin, we think it proper to connect the description of their geological characters, with that of the formation in which they exist.

These metallic deposits consist chiefly in oxidule of iron or common magnetic iron ore, Franklinite and red zinc ore. The oxidule of iron is found in large flattened masses, parallel to the divisions in the sienite; it occurs in the sienite only and is always inferior to the Franklinite; it never comes in contact with the limestone; near it, the sienite is often of a coarser grain, so as to present masses of pure feldspar or hornblende near the ore. The oxidule is sometimes considerably intermixed with graphite; so much so as to prevent its being worked for iron. The Franklinite and red zinc ore form a mass which has been traced upon upwards of five miles, and whose breadth or thickness is rarely less than ten, and is often thirty or more feet. Its

depth is unknown, but it may be inferred to be considerable, from its rising into hills of upwards of two hundred feet in elevation. This mass varies in its composition—in some places the red zinc ore, in others the Franklinite predominates. The red zinc ore abounds at Sterling, where these variations in the nature of the mass can be well observed; at Franklin, the Franklinite constitutes by far the greater part of the metallic mass; we perceived in it no signs of internal stratification; resting upon this bed of Franklinite and red zinc ore, is a bed or layer of carbonate of lime and sienite. This is the subordinate bed of limestone which we have already described; it is irregularly mixed with the sienite, and imbeds masses of it; it is principally in the cavities or druses of this sienite, that many of the minerals hereafter to be noticed are found; these minerals appear in many instances to be of contemporaneous origin with the sienite, but the cavities are filled up with carbonate of lime, which is probably of posterior formation. Upon this bed the sienite is again found without any remarkable character attending it, except the presence of quartz masses; in this sienite no other mineral has as yet been observed. All the rocks which we have described are in parallel superposition and are presumed to be of almost contemporaneous origin. The case is however different with those which we are about to describe. Next to the sienite, but evidently of a later formation, is found a mass of grauwacke of no great thickness. This

grauwacke is generally fine grained, of a light gray colour ; the fragments, as well as the cement which connects them, appear to belong to quartz ; it is found on the north side of the ridge, in thin beds or layers, directed from the north-east to the south-west, and dipping to the north-west ; this grauwacke is evidently of posterior formation to the sienite, and must have been formed, after the surface of this rock had undergone those changes which we at present observe in it ; for instead of presenting a parallel stratification, it is found inclining in a diametrically opposite direction, and covering the edges or crest* of the layers of sienite, as is observed in fig. 2. plate. The grauwacke and its mode of superposition can be well observed on the road from Franklin to Dr. Fowler's, (the owner of the spot) at about a quarter of a mile below the furnace ; it is covered by a blue limestone, which rests upon it in parallel superposition ; this limestone is found in layers or beds of variable thickness ; its colour is a pale gray, sometimes of a deeper gray, passing into blue ; its texture is compact or subsaccaroidal ; near the grauwacke it is slaty ; it contains as well as the grauwacke, fluates of lime, of a pale violet colour, which is found in small cavities in the limestone, and appears to have been formed by infiltrations into it, and the rocks under it ; it cannot, therefore, serve to connect these rocks with the sienite, in the limestone of which, it

* *Outgoings* of Jameson.

has also been found, or to prove them to be of contemporaneous origin, as has been supposed by some geologists ; but this hypothesis is in direct opposition to the fact, which we have previously mentioned of its being found resting upon the edges of the layers of sienite ; this mistake may have originated from observing the blue limestone on the south side of the ridge, dipping to the south-east, and in apparently parallel stratification with the sienite ; but there can remain no doubt on the subject, when we connect this limestone with that found upon the grauwacke half a mile below ; we then find that their stratification is quite independent of that of the sienite, but that it depends upon the irregularities of the surface of the sienite at the time of their formation, and that this limestone covers the sienite in a real *mantle-formed* superposition. It has been said, that this limestone contained impressions of organic remains, we have searched for them with particular care, but have met with none ; we think it not unlikely, that had there been any in the rock, we could not well have missed them, especially as our examination was particularly directed towards the spot where we were told that they had been found.

It is, however, extremely probable that this limestone was deposited with the remains of marine animals ; which were subsequently dissolved, as well as that part of the rock which had received their impression ; this opinion is not entirely hypothetical, but derives support from what appears to have been irregular but small cavities, now occupied by calcspar

or lamellar carbonate of lime, similar to what we observe in many of the transition and older secondary limestone, where cavities are observed exhibiting the external impression of marine organic bodies, filled with the same kind of crystalline carbonate of lime; it may, also, be necessary to add, that similar appearances are never presented by primitive limestone; it is not at all improbable that the occurrence of lamellar carbonate of lime, in the manner just mentioned, may have induced a belief that it contained fossil shells. The limestone found at Franklin upon the grauwacke, appears to be contemporaneous with that of the valley, north of Schooley's mountain, also with that of Easton and north of Reading in Pennsylvania, and in fact with all the limestone occurring east of our great chain of mountains; excepting always, however, our primitive limestone, and that which accompanies the old red sand stone formation; with it is likewise found, the same blue flint or siliceous slate and occasionally hyaline quartz in crystals.

In order that the geology of the country which we have attempted to describe, may be so intelligible as to be understood by those who are not even conversant with the subject, we have thought proper to annex the two following diagrams, (vide plate) the first showing the geographical or superficial disposition of the rocks we have described, and the second one, their geological position or arrangement; this latter section is the result of our observations made on the road, which lies on the north side of the mill-pond at

Franklin, commencing and terminating with the blue limestone, that being the rock which forms the lateral boundary or breadth of our range.

The following is a list of the minerals which we have found in the vicinity of Franklin; a minute description of many of them will be given shortly.

1. Dysluite,* a new mineral.
2. Jeffersonite.
3. Franklinite.
4. Red zinc ore.
5. Carbonate of zinc.
6. Silicious oxide of zinc.
7. Corundum.
8. Automalite
9. Spinelle.
10. Zircon.
11. Feldspar.
12. Scapolite.
13. Pyroxene.
14. Amphibole.
15. Garnet.
16. Mica.
17. Vesuvian.
18. Chondrodite.
19. Carbonate of lime.

* The Dysluite is a new mineral, which crystallizes in regular octohedrons. Its specific gravity is from 4.35—4.60. It is infusible before the blowpipe: a full account of this mineral may be expected in a subsequent number.

- 20. Quartz.
- 21. Tourmaline.
- 22. Silico-calcareous oxide of Titanium.
- 23. Graphite.
- 24. Oxidule of Iron.
- 25. Iron Pyrites.
- 26. Arsenical Pyrites.
- 27. Epidote.
- 28. Blue carbonate of Copper.
- 29. Green carbonate of Copper

In addition to which we will add, on the authority of Mr. Jessup :

Diallage at Sparta.

Observations upon the Cadmia found at the Ancram iron works in Columbia County, New York, erroneously supposed to be a new mineral.

By W. M. H. KEATING. Read Sept. 10th, 1822.

In the second number of the first volume of the New York Medical and Physical Journal, Dr. Torrey has published a description and analysis of a substance, which he considered as a new mineral and for which he proposed the name of green oxide of zinc: a specimen of this substance having been handed to me last spring, I immediately recognised it to be similar in its nature and appearance, to a product of the iron furnaces of Belgium, which has been described by Mr. Bouesnel in the "Journal des Mines," (Vol. 29. p. 35,) under the name of cadmia. Having had an opportunity of collecting on the spot* the most satisfactory proofs in support of my opinion, I beg leave to offer to the Academy, the following account of this substance: It was first noticed at Ancram in the year 1812, when it was found in pulling down a stone wall connected with the iron furnace, which belongs to general Livingston, and is now under the direction of Walter Patterson, Esq. It excited some interest among the mineralogists of New York, but no public notice of it was taken until lately. Mr. Bouesnel's

* These observations were made during a short visit to Ancram, in company with Mr. Vanuxem, who likewise, at the first inspection, recognized this substance to be cadmia.

observations on this subject are very full ; these and a few short notes by Messrs. Collet Descotils, Heron de Villefosse and Berthier in the "Journal and Annales des Mines," are the only notices of it I have ever met with ; I have sought in vain for a mention of it in English works. The cadmia of Belgium is a new and rare metallurgical product, which is formed in iron furnaces about five or six feet below their orifice, and immediately under the charge ; it there forms an annular disk or ring, which increases continually in thickness, and which, if not removed, would choke the furnace ; it forms in the Belgian furnaces, according to Mr. Bouesnel, "a ring of about sixteen inches in height, offering in the profile or vertical section, a curvilineal triangle, the base of which rests upon the sides of the furnace ; and the apex, which corresponds with its greatest breadth, is but little distant from the lower part of the ring, so that the triangle appears in some cases almost rectangular." I have seen a piece found at Ancram, which presented tolerably well the above described characters, and corresponded exactly with Mr. Bouesnel's description ; like the European, it was found in tabular masses, presenting in many cases a distinct slaty structure. The substance has often a striped aspect ; its colour is grayish, inclining to yellow, green or black. The specific gravity of the European is 5. 25, of the American 4. 92 ; this difference is not very great, and may in part be accounted for, by the fact that the former contains a small quantity of lead, which varies from 2. 4 to 6. 0 per 100. 0.

The chemical analysis of this substance made in New York, has rendered it unnecessary for me to undertake that which I proposed making. I shall merely add a comparative view of the results of the analyses, made upon the European and American.

	Bouesnel.	Drappier.	Berthier.	Torrey.
Oxide of Zinc	90. 1	94. 0	87. 0	93. 5
————— Lead	6. 0	2. 4	4. 9	
————— Iron	1. 6	2. 6	3. 6	3. 5
Carbon	1. 0	. 5	. 6	1. 0
Silex, earths, sand, &c.	1. 8		3. 4	
	100. 5	99. 5	99. 5	98. 0

These analyses present a remarkable coincidence, except in the presence of lead in the European, and its absence in the American cadmia; but this difference is of no importance; in Belgium Mr. Bouesnel tells us that the iron ore is visibly intermixed with lead ore, and this accounts for its existence in the cadmia; we are also told that lead is found there in the furnaces below the metallic iron. It is not difficult to account for the presence of zinc with the iron ore, for in examining the ore bed at Salisbury, (14 miles east of the furnace) we ascertained that the hematite was found in the side of a hill, incumbent upon the shist and, as it were, incased in the decomposed part of it, and that the adjoining shist was very much broken up and altered; it does not appear that the hematite is the result of infiltration alone, for masses of micaceous iron ore are found connected with it, which appear to indicate that it results in part, at least,

from the decomposition of oxidule or oligist iron ore. We know that this shist contains blende or sulphuret of zinc, in some places at least, as at the Ancram lead works, and this may account for the presence of zinc.

Mr. Bouesnel has endeavoured to explain the formation of these cadmia, in a manner which does not appear to me to be satisfactory; I would rather admit that it results from a reduction of the oxide or carbonate of zinc, which is intermixed in small quantities with the iron ore; that this reduction takes place in the furnace; that the zinc sublimes and oxydates as it rises, and settles in the form of a ring at the inferior part of the charge, where the temperature of the furnace is considerably lowered by the successive additions of cold ore, charcoal, &c.

This substance is not, it is true, found at present forming in the Ancram furnace; but this may in a great measure be owing to a better roasting of the ore, previous to its introduction into the furnace. It may also be occasioned by the circumstance that all the ore destined for Ancram is picked with great care, at the ore bed. I must not, however, omit to state that I found in the flue erected above the orifice of the furnace, for the protection of the workmen, a red pulverulent substance, to which the workmen have given the name of *sulphur*, a name which, as the editor of the Emporium has well observed, has been most unfortunately given by furnace and forge men, to every product which puzzles them, and without any regard to its real composition: this powder I supposed to be a mixture of ashes and fine ore, blown

out of the furnace by the rapid current of air ; I conceived that if there was any zinc with the ore, it would be likely to be detected in this substance, accordingly I found by analysis, about 8 per cent. of oxide of zinc, a quantity much greater than I expected. It would require a more accurate study of the progress of the furnace than I could make in two days, and a better knowledge of the methods formerly in use, to determine why cadmia are not formed there at present, as they were formerly. Dr. Torrey has, I believe, never visited Ancram, and the information which he received on the subject may have led him into error. For instance, he was misinformed (I think) when he stated, that “it was found when taking down one of the old walls of the furnace, erected in the year 1744.” We were told by Mr. Patterson, that it had never been found but in taking down a wall *connected* with the furnace, and which having been built after the furnace, may have contained materials which had been extracted from it at different times. This observation is of more importance than it at first appears ; for if, as Mr. Patterson told us, the Ancram furnace was the first erected in the colonies of North America, or at least, the first in the province of New York, and if, according to Dr. Torrey, the cadmia had been found in the wall of the first furnace erected, the substance must have pre-existed to any furnace known to have been erected there, which we think is not the case.

But, in addition to all the above mentioned proofs,

and to those which might be drawn from the circumstance of its being found in the vicinity of a furnace, I have been able to obtain the evidence of men to the fact of its having been formed in it. Having been informed that ore from the same bed was used at the works belonging to Messrs. Holley and Coffing, near Salisbury, I repaired there with a hope of finding the cadmia near that furnace also. After a short search, I found it in its immediate vicinity, and was informed by Mr. Holley, that he had himself taken it out of his furnace about twelve years ago, when they renewed the stack. He was positive that it was the same ; that it had been found about six feet below the orifice of the furnace, and that if not occasionally removed, it would have eventually choked it. I even understood him or his partner to say, that this substance was even at present occasionally formed in the furnace in pieces of almost one-eighth of an inch in thickness. One of the reasons why it is still formed at Salisbury, and not at Ancram, is probably owing to the ore used at Ancram being picked, and the other not. Mr. Patterson thinks his ore is also better roasted.

According to Mr. Heron de Villefosse, a similar substance is formed in the copper and lead furnaces of Julius, Sophia, and Ocker, near Goslar, in the Hartz. At Goslar, as well as at Jemmapes in Belgium, this cadmia is considered as the best material that could be used in the manufacture of brass ; as it is purer than the roasted calamine, it is preferred to it, as well as to all other zinciferous substances. It had

not, I believe, been used in Belgium before Mr. Bouesnel described it. Should it be found in any quantity at our furnaces, it would no doubt be equally advantageous to work it with copper for brass.

This substance has not yet been observed in many places. I believe the only spot where it has been noticed, in addition to the above mentioned, is at Verrieres, in France, where I discovered it in the year 1819.* I am inclined to think that if more care were taken by our iron masters, in observing the progress of their furnaces, and the products which they yield, it might be found in many other places; certainly it must have been formed in the old Franklin furnace, in Sussex county, New Jersey, where so many fruitless attempts were made to work the Franklinite.

* As no account of the cadmia of Verrieres has as yet been published, I shall here add the note which I made on the subject in my journal.—“July 6, 1819. I visited the furnace of Verrieres, in the department de la Vienne, in France. The director mentioned that his ore was good, and that the iron it produced was likewise good. He complained, however, of a substance which formed in the furnace, five feet below its orifice; it was in the form of a ring. It would, he said, have choked the furnace, if not removed, which at times was a difficult undertaking. I mentioned to him that it appeared to be analogous to the cadmia of Belgium. The specimens which I took with me were heavy, compact, and of a dark colour.”—I have not had an opportunity of analyzing them since; but my suspicions on this subject were confirmed, when, on returning to Paris in the autumn of 1820, I was informed that the Engineer of mines De Cressac had discovered calamine in that vicinity the year before.

Before I conclude these remarks, I must observe, that it does not appear that the presence of zinc affects the properties of iron. In Belgium the iron is of good quality; and it is an interesting fact, that the bar-iron of Ancram is in great demand at \$120 per ton, a higher price than is at present paid for any imported iron. The castings from the Ancram furnace are in such repute, that no other pigs are used at the West Point foundry for the heavy guns (32 and 42 pounders) now casting for the United States' navy.

The Ancram furnace equals, in beauty of workmanship, and economy of means, any that we have seen; and we entertain no doubt, that all works carried on with such admirable perfection, must and will always prove equally honourable and profitable to their owners and directors.

On the Onykia Angulata. By C. A. LESUEUR.
Read Sept. 10, 1822.

Shortly after I had published descriptions of several new species belonging to the family of the Loli-goes, Dr. Hays favoured me with several animals, collected by Dr. Hodge, during his voyage from the East Indies to the United States. Among these was a very small individual of the genus *Exocetus*, and a specimen of the genus *Salmo*. This latter offered very peculiar characters in the form of its teeth, which are hooked and armed with a small interior

process, as in the hooks, and also in the long and broad pectoral and ventral fins. Likewise, a beautiful individual of the genus *Onykia*, which appeared to me to be of the same species as that which we observed in the Atlantic ocean, and of which I have given a figure, accompanied with a note, vol. ii. p. 99, of this work, under the name *P. angulata*. The figure was engraved from a design made by Mr. Petit, on board the *Geographe*, in the voyage from Teneriffe to the Isle of France.

The form of its body and of its tentaculæ, having a strong resemblance to those represented in that figure of *O. angulata*, leave me no room to doubt that it is to the same species that this animal belongs.

I much regret the circumstance of my not seeing this specimen sooner, so as to have described it with the preceding species ; and I profit by this occasion to testify my acknowledgments to Dr. Hays, for having communicated it to me as soon as it was at his disposal, thus enabling me to add a more complete description to the indication given in the first part of this volume. This specimen serves, moreover, to confirm the characters that I assigned to this genus, and also induces me to propose the following generic divisions, viz.

* *Long arms*, armed with hooks, accompanied by suckers.

O. caribœa belongs to this division.

** *Long arms*, furnished with hooks, without suckers at their lateral base.

O. angulata.

Two long arms, subcarinated, armed at their extremity by two ranges of hooks, of which the exterior ones are larger; a small disk composed of suckers at the lower part of the hand, and several others at the extremity.

DESCRIPTION.—*Body* cylindrical superiorly, attenuated posteriorly, and terminated in a point, which is enveloped by a subrhomboidal fin, longer than the anterior portion of the body; its length is two inches and four lines; its angles are less acute than in the figure before published, which is but a slight variation; there are eight unequal tentaculæ, the superior ones are short, subtriangular, and destitute of longitudinal membranes, the two lateral pairs and the inferior ones are furnished with a lateral and exterior membrane, opposed to the suckers; this membrane is less obvious on the superior lateral tentaculæ; these eight tentaculæ are furnished with suckers, placed on two ranges alternately towards the base of the tentaculæ, and forming but a single range at their extremities; these suckers are semispheric, pedunculated, very small, and protected by a slight border on each side of the tentaculæ.

The two long arms are four inches in length, without comprising the unguiculated extremities; they are subcylindric and subcarinated, with a slight appearance of articulation at the base of the enlarged extremity which supports the hooks; this extremity is one inch in length, and furnished with two ranges of hooks, about ten in each range; these are at first

small, becoming larger near the extremity of the range, particularly the exterior ones, of which the longest are nearly two lines ; the interior range are smaller, and placed at the base of the larger ones, in order to replace them when they are destroyed ; these hooks are moveable, straight, and compressed at their base, and terminated by a curved point ; they are covered by a whitish contractile membrane, open at the extremity to admit the passage of the hook. It appeared to me also, that this membrane was divided at its base. Is this division for the purpose of permitting a free pressure upon the dilated and perforated part at the base of the hooks, where is perhaps hidden a venomous vesicle ? Besides, we remark upon the sides of the hooks, where they are naked, grooves, which are continued to the curve of the hook ; this small opening may probably serve to give a greater extent for muscular attachment.

The interior bone is of a transparent bistre colour ; its substance is horny diaphanous ; it is lightly arquated, and of the form of a small elongated boat ; its carina or ridge being stronger and darker, the transverse section of its middle was in the form of an open V, and was much closed towards the posterior part of the bone, which terminated by a small, elongated cup or hollow cone.

The *colour* is very beautiful, as in all the species of this genus, and occasioned by the numerous small points, which cover all the body, the tentaculæ, and the arms.

The figure is of the natural size ; see plate.

Description of some Crystals of Sulphate of Strontian, from Lake Erie. BY DR. G. TROOST. Read August 6th, 1822.

The south-western part of Moss island, in Lake Erie, has furnished the mineralogical cabinets of our country with some ornamental specimens of sulphate of strontian, equal, if not superior in beauty, to any collected at former known localities. It was not until some time after its first discovery, that any well determined forms of this mineral came under my observation, so as to enable me to determine to what variety it belonged; lately the zealous mineralogist Mr. Jessup, furnished me with two crystals from his collection, having most of their faces and angles preserved sufficiently perfect to enable me to submit them to measurement.

The description given by Cleaveland, in the second edition of his valuable treatise on mineralogy, is rather vague, being applicable as well to the varieties of sulphate of barytes, as to those of the sulphate of strontian, the same forms existing in both minerals, and as is justly remarked by the Abbe Haüy in his *Tableau de Mineralogie*, "crystallization has co-operated to approximate two substances, already so nearly related by their other properties, by assigning to them forms, which seem to have been cast in the same moulds; the goniometer alone, is here the compass which can guide the observer." I

beg leave therefore, to offer to the Academy a more accurate description of these crystals.

Fig. 3.

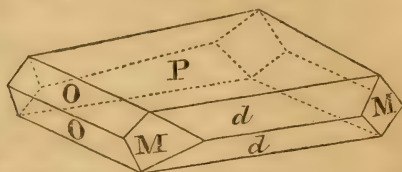


Fig. 1.

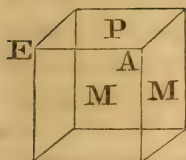
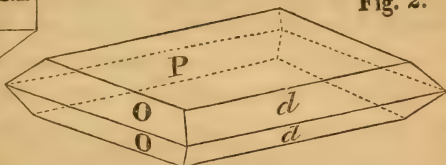


Fig. 2.



PRIMITIVE FORM. A straight prism, with rhomboidal base, of which the angles are $104^{\circ} 48'$ and $75^{\circ} 12'$ fig. 1.

SULPHATE OF STRONTIAN, *trapezienne* $\begin{matrix} \overset{2}{\text{A}} \overset{1}{\text{E}} \text{P} \\ \text{d o P} \end{matrix}$

fig. 2. the inclination upon the faces are of o upon P $128^{\circ} 31'$; of o upon o $77^{\circ} 2'$; of o upon the returning face $102^{\circ} 58'$; of d upon d $101^{\circ} 32'$.

SULPHATE OF STRONTIAN, *epointée* $\begin{matrix} \overset{2}{\text{M}} \overset{1}{\text{A}} \overset{1}{\text{E}} \text{P} \\ \text{M d o P} \end{matrix}$

fig. 3. The former variety having the solid angles deeply truncated, forming faces parallel to the sides of the primitive rhomboidal prism. The inclination of M upon M is $104^{\circ} 48'$; that of the other faces coincides with the inclinations of the *trapezienne*.

The crystals are translucent in a great degree, approaching to transparent, and of a bluish-white colour. The size of the crystals is large. I have seen fragments belonging to crystals, which must have been from four to five inches, belonging to the subvariety *trapezienne elargie*.

The surface of the faces o o are usually dull, of a more opaque milky-white than the remainder of the faces, which have a remarkably fine lustre; the faces corresponding with those of the primitive rhomboidal prism, as P and M display a fine iridescent colour.

An account of some of the marine shells of the United States. By THOMAS SAY.

[CONTINUED FROM PAGE 276.]

3. T. **Iris*. *Shell* very thin and fragile, pellucid, compressed, transversely oblong-suboval, iridescent, white, with generally a rosaceous disk and one or two anterior rays, with numerous minute concentric wrinkles, and minute, oblique, acutely impressed, equidistant striæ crossing them; striæ abbreviated before and not attaining the anterior margin, which is narrowed and subacute; *basal edge* rectilinear opposite to the beaks.

Length more than three-tenths of an inch.

Breadth more than eleven-twentieths of an inch.

Inhabits the southern shores.

Cabinet of the Academy and Philadelphia Museum.

A beautiful little species, very remarkable by the oblique course of the striæ. It is rather common.

4. T. **flexuosa*. *Shell* suborbicular, white; anterior margin longer than the posterior one, and less obtusely rounded; *beak* placed behind the middle, not prominent; *surface* obliquely sculptured with very regular, parallel, impressed lines, which, on the anterior margin, are four or five times refracted and infracted alternately; longitudinal striæ none; transverse wrinkles minute.

Length nine-twentieths of an inch.

Breadth rather more.

Thickness one-fourth of an inch.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

The fold on the anterior margin is very slight, but perceptible, and is rendered remarkable by the zig-zag course of the oblique striæ over it.

5. T. **tenera*. *Shell* very thin and fragile, pellucid, compressed, transversely oblong-suboval, whitish, iridescent, concentrically wrinkled; *basal edge* arquated, not rectilinear opposite to the beaks; *hinge* teeth two, larger one emarginate; *posterior tooth* but little elevated; *anterior tooth* obsolete; *beak* placed behind the middle.

Length three-tenths of an inch nearly.

Breadth half an inch.

Inhabits the coast of New Jersey.

Cabinet of the Academy.

Very much resembles *T. iris*, but is destitute of the oblique striæ which are so ornamental to that species, from which it also differs in being arquated on the whole length of the basal edge. It was discovered by my brother Mr. Benjamin Say, near Great Egg Harbour.

PSAMMOBIA ? *Lam.*

SPECIES.

*P. *lusoria.* *Shell* transversely, oblong-suboval, bluish-white, with minute transverse wrinkles ; *apex* rather nearer the anterior end ; *anterior margin* narrowed, inclining to the left at the end and gaping ; *cartilage slope* rectilinear, with an obtuse, obsolete, convex line on the left valve.

Length three-fifths of an inch.

Breadth one inch.

Inhabits the southern states.

Cabinet of the Academy and Philadelphia Museum.

This shell does not appear to be very common. It seems to vary in having often two teeth on each valve, as in *Sanguinolaria*.

DONAX, *Lin.*

SPECIES.

1. *D. *variabilis.* Shell triangular; anterior margin obliquely truncated, cordate, suture a little convex; posterior hinge margin nearly rectilinear, suture indented; base a little prominent, beyond a regular curve, near the middle; valves longitudinally striated with numerous, equal, parallel, regular, impressed lines, hardly visible to the unassisted eye, and obsolete on the posterior margin; basal edge within crenate.

Length half an inch.

Width nine-tenths of an inch.

Thickness seven-twentieths of an inch.

Inhabits the coasts of Georgia and East Florida.

Cabinet of the Academy and Philadelphia Museum.

Varies very much in colour and is a very pretty shell. Its usual varieties are red, white, yellow, or elegantly radiated with dilated reddish-brown lines, upon a white or yellow ground; lines are purpurescent within the shell. A very common shell; I found it more particularly numerous on the beach of Cumberland island, where, in favourable situations, at the recess of the tide, it may be taken up in handfuls, without any intermixture of sand. It is very distinct from *D. rugosa*, but approaches much nearer to *D. trunculus*, from which it is distinguished by being

more abruptly truncated before, smaller, and the longitudinal lines are more indented. I have no doubt but this species has been regarded, by authors, as the same with *trunculus*, if so, judging by an individual of that species in the collection of the Academy, at least two distinct species have been confounded together under that common name.

2. D. **fossor*. *Shell* subtriangular ; *anterior margin* short and rounded ; *posterior hinge slope* rectilinear ; *base* very slightly prominent beyond a regular curve at the middle ; *valves* longitudinally striated with numerous, equal, parallel, regular impressed lines, not visible to the unassisted eye, and obsolete on the posterior margin ; *basal edge* within crenate ; *colour* pale-livid, with two longitudinal whitish rays before the middle, both within and without.

Var. a. Whitish. Var. b. Yellowish.

Breadth from half an inch to three-fifths.

Inhabits the coasts of New Jersey and Maryland.

Cabinet of the Academy and Philadelphia Museum.

Very numerous under the surface of the sand, which is exposed at the recess of the tide. A wave by removing the surface of the sand, exposes a great many individuals to view, at its refluxence, these immediately penetrate the sand, and before the recurrence of the surge they are concealed.

They are preyed upon by several shore birds and fish ; the drum (*Sciæna chromis*) and sheep's-head, (*Sparus ovicephalus*) are sometimes caught in the

surf in considerable numbers, whilst in pursuit of them.

AMPHIDESMA, Lam.

SPECIES.

1. A. **orbiculata*. *Shell* orbicular, somewhat compressed; *beak* nearly central, and a little prominent; *posterior slope* a little concave near the beak; *lunule* small; *valves* slightly wrinkled transversely; *anterior submargin* with an obsolete very obtuse undulation, and with a few longitudinal obsolete lines; *colour* dirty white; *hinge* with two lamellar teeth, the posterior one placed near to the primary tooth, and shorter than the anterior one; *interior ligament cavity* profound, fusiform, parallel with the anterior slope, originating at the extreme tip of the beak, and terminating nearly opposite to the middle of the anterior lamellar tooth.

Length one inch and one-tenth.

Breadth one inch and one-tenth.

Inhabits the coast of Georgia.

Cabinet of the Academy and Philadelphia Museum.

Appears to be a rare species; the largest I have seen is one inch and two-fifths in breadth.

2. A. **æqualis*. *Shell* orbicular, slightly oblique, polished, white, with very minute and numerous concentric wrinkles near the margin, which are obsolete

on the disk and umbo ; *lateral teeth* none ; *primary teeth* two in the left valve and one in the other ; *interior ligament cavity* subfusiform, as long as the exterior ligament.

Length two-fifths of an inch.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

A small species, not very commonly found.

3. A. **punctata*. *Shell* orbicular, white, with very minute, numerous, concentric wrinkles, and very minute, numerous punctures ; *lateral teeth* none ; *primary teeth* two in each valve, of which one has a deep groove, which gives it a bifid appearance ; groove of the interior cartilage not very distinct ; *within* a small projecting rim or elevated line near the edge, extends from the hinge to the basal margin.

Length about seven-twentieths of an inch.

Breadth much the same.

Inhabits the southern shores.

Cabinet of the Academy.

This shell bears a strong resemblance to the preceding, on an exterior and transient view of its valves ; but on examination it will be perceived to be more orbicular and less oblique, and that the surface is less polished. By the aid of a magnifier, the surface will be observed to exhibit a remarkable punctured appearance.

MACTRA, Lam.

SPECIES.

1. *M. *similis*. Shell subtrigonal, smooth, or very slightly wrinkled, white on the disk or upon the umbones, and dirty light brownish colour on the margin; *umbones* nearly central; *lateral teeth* strongly and regularly crenated on the side next the recipient cavity.

Length one inch and three-twentieths, nearly.

Width one inch and two-fifths.

Inhabits the coast of the United States.

Cabinet of the Academy.

The specimens which I obtained from the coast of New Jersey seem closely allied to *Var. a.* of *M. solida* as presented on pl. 258, fig. 1. of the Encyc. Method., the proportions of the different parts of the shell nearly corresponding with those of that figure. But upon comparing it with several specimens of *M. solida* sent to the Academy by Mr. O'Kelly of Ireland, I find its proportions to be altogether different, being longer and not so wide.

2. *M. *lateralis*. Shell triangular, very convex, of a smooth appearance, but with very minute, transverse wrinkles; *lateral margins* flattened, cordate, with a rectilinear, sometimes concave profile, one margin rounded at the tip, the other longer and less obtuse; *umbo* nearly central, prominent.

Length half an inch.

Breadth thirteen-twentieths of an inch.

Thickness seven-twentieths of an inch.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

A very common shell on almost all parts of our coast.

3. M. **oblonga*. Shell transverse, oblong-oval; very slightly wrinkled, excepting upon the margin; *umbo* hardly prominent; two strong distant lines or folds drawn from the apex to the anterior extremity of the shell; *colour* dull whitish, hardly polished, *umbo* slightly tinged with ferruginous, within white, highly polished.

Length nine-twentieths of an inch.

Breadth one inch and nine-tenths.

Inhabits the coast of Georgia.

Cabinet of the Academy and Philadelphia Museum.

Of this species I found but three valves, on one of the sea islands of Georgia.

LUTRARIA, Lam.

SPECIES.

1. L. **lineata*. Shell transversely suboval, thin, white, tinged with ferruginous; posterior hiatus patulous, anterior one linear and commencing below

the hinge slope ; *hinge slope* with a rectilinear profile, and flattened, oblong-subcordate surface ; *valves* unequally wrinkled ; *posterior margin* rounded, short, with a reflected edge, and submarginal carinated line ; *within* undulated, anterior margin glabrous, and with an indented submarginal line corresponding with the exterior carinated one.

Length one inch and nine-tenths.

Width two inches and seven-tenths.

Thickness one inch and one-twentieth.

Inhabits the coasts of Georgia and East Florida.

Cabinet of the Academy and Philadelphia Museum.

Not uncommon on the southern coast, and may be readily distinguished by the carinated line on the posterior submargin.

2. L. **canaliculata*. *Shell* transversely oval-orbicular, very thin and fragile, white, inflated ; *valves* equally, concentrically, and regularly grooved, with very feint parallel lines within the grooves ; *posterior margin* short, subcuneiform, compressed ; a marginal, longitudinal, irregular, subimpressed line, between which and the edge, the grooves become mere wrinkles ; *posterior slope* subrectilinear, hiatus considerable ; *anterior margin* regularly curved, the slope convex ; *within* grooved as without, anterior angle glabrous.

Greatest length two inches and one-twentieth.

Breadth two inches and a half.

Thickness one inch and one-fourth.

Occurs on the coast of Maryland and as far south as East Florida.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

Very distinct from the preceding species, and probably approaches *L. crassiplica* of Lamarck.

CORBULA, Brug.

SPECIES.

1. *C. *contracta*. *Shell* transversely subovate; valves subequal, regularly and profoundly striated transversely; *beaks* not prominent, nearly central, one side rounded and the other subacute; *basal margin* contracted near the middle, and one half of the length of the edge of one valve concealing one half of the edge of the opposite valve.

Length one-fourth of an inch.

Breadth two-fifths of an inch.

Thickness one-fifth of an inch, nearly.

Inhabits the coasts of Georgia and East Florida.

Cabinet of the Academy and Philadelphia Museum.

I found only two specimens of this shell. The striae are precisely similar to those of the larger valve of *Mya inaequalvis* of Montague (*C. nucleus* of Lam.)

MYA, Lam.

SPECIES.

1. *M. *acuta*. Shell oblong-subovate, narrowed behind, rather strongly wrinkled; *posterior hinge margin* and *posterior basal margin* subequally arquated; tip of the posterior margin equidistant from the apex and middle of the base; *tooth* moderate, with a small, not prominent, tooth on its posterior side.

Length one inch and a half.

Breadth two inches and four-fifths.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

I have but two valves, which are old and bleached. It resembles *M. arenaria*, but is much smaller at the posterior termination than the corresponding part of that shell, as figured by Bruguiere. One of the valves alluded to, is more than four inches in breadth; it corresponds very well in the outline with Pennant's fig. of *Arenaria*. My decorticated specimens have an obsoletely radiated appearance.

2. *M. *mercenaria*. Shell subovate, convex, somewhat unequal, transversely wrinkled; *posterior hinge margin* curving abruptly downward to the tip of the posterior margin, which is much nearer to the middle of the base than to the apex; *tooth* robust, promi-

ment, very convex within, and with a small tooth on its posterior side ; *within* white.

Length one and three-tenths of an inch.

Breadth two inches.

Inhabits the coast of the United States.

Cabinet of the Academy and Philadelphia Museum.

This species, as well as the preceding, is known by the name of the *Maninose* or *Piss clam*, from the circumstance of its occasionally ejecting a sudden jet of water, to a considerable height above the surface of the sand, during the reflux of the tide. This jet may be commanded, by stamping upon the sand with the foot, near the entrance of their dwelling : it is sometimes brought to our markets, and is by many persons highly esteemed as food, it is said by some to be preferable to the common clam ; (*Venus mercenaria*.)

ANATINA, *Lam.*

SPECIES.

A. **papyratia*. *Shell* turgid, very thin and fragile, transversely ovate, one valve very convex, and at the basal margin projecting a little beyond the edge of the other ; *beaks* not prominent, placed near one end ; surface of the valves very slightly wrinkled, white ; shorter margin a little gaping, and with a longitudinal wave ; *tooth* very oblique.

Inhabits the southern coast.

Length two-fifths of an inch.

Width thirteen twentieths of an inch.

Thickness one-fourth of an inch.

Cabinet of the Academy and Philadelphia Museum.

This species does not appear to be very common.

SOLEN, *Lam.*

SPECIES.

1. *S. *costatus*. *Shell* transversely elongate-oval, concentrically wrinkled, very much compressed, very thin and fragile, rounded at each end; *hinge* nearly equidistant from the posterior termination of the shell, and the middle of the hinge margin; *teeth* two, sometimes none, in each valve, the posterior one upright, the other inclining forward; a strong, broad, elevated line within, passes from the hinge towards the base and becomes obsolete near that part; *colour* pale violaceous, with about three whitish rays.

Breadth one inch and a half.

Inhabits Great Egg Harbour, New Jersey.

Cabinet of the Academy.

Rather rare, I have obtained but few and incomplete specimens. The internal costa is somewhat similar to that of *S. legumen*, but it is much more elongated, and does not incline obliquely forward, as in that shell; it probably approaches nearest to *S. minimus* of Tranquebar.

2. *S. *centralis*. *Shell* transversely oblong-oval, slightly wrinkled concentrically, compressed, fragile, rounded at each end; *hinge* central, *teeth* two in the left valve and one in the right; *epidermis* pale yellowish-brown; a broad obsoletely elevated line within, passes from the hinge towards the base, and terminates beyond the middle.

Length half an inch.

Breadth one inch and three-tenths.

Inhabits the southern shores.

Cabinet of the Academy and Philadelphia Museum.

Somewhat rare. It has very much the appearance, at first sight, of the young of *S. carabæus*, but it cannot be mistaken for it, as the teeth of the hinge are invariably central, whilst those of that species are anterior to the centre, and the interior of the shell of that species has never the slightest appearance of a costa.

3. *S. *viridis*. *Shell* fragile, elongated, compressed, a little narrowed before, slightly wrinkled concentrically, the wrinkles regularly rounded towards the extremity; *hinge margin* nearly rectilinear; *basal margin* a little arquated; *anterior tip* rounded; *posterior tip* obliquely truncated, a little reflected, and rounded near the base; *hinge* terminal; *teeth* one in each valve, each having a flattened vertical surface, which turns upon that of the opposite tooth; *epidermis* pale green.

Length nine-twentieths of an inch, nearly.

Breadth two and three-twentieths of an inch.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

A common shell. The hinge is formed upon the same plan with that of the *S. vagina* and *truncatus*, but it differs from those species, in being much more rounded at each extremity, and in being narrowed at the anterior tip. I think it probable, however, that this species has been regarded as a variety of *S. truncatus*.

SOLEMYA, Lam.

SPECIES.

*S. *velum.* Shell remarkably thin and fragile, transversely-oblong, rather longer at the posterior end; hinge edentulous, placed near the anterior end, with a slightly prominent cartilage, and an interior elevated callus, which is fornicated beneath; valves radiated with about fifteen double lines, which are sparse towards the middle of the valves; epidermis pale yellowish-brown, extending much beyond the basal and lateral edges of the valves, and at the hinge margin, connecting them together nearly the whole length of the shell; within bluish-white; umbos destitute of the slightest elevation; anterior and posterior margins rounded; superior and inferior margins rectilinear, parallel.

Length seven-twentieths of an inch.

Breadth nineteen-twentieths of an inch.

Inhabits the southern coast.

Cabinet of the Academy.

Occurs sometimes, cast on shore generally in fragments, but is by no means a common shell.

SAXICAVA, *Bellevue*.

SPECIES.

*S. *distorta*. Shell thick, inequal, rugged, transversely oblong-subovate; *epidermis* pale-brownish, much wrinkled; *umbo* prominent, placed very far back; *posterior margin* rounded, generally very short; *anterior margin* often truncated, with a prominent ridge passing from its inferior angle to the beak.

Length about three-fifths of an inch.

Width about one inch.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

When young, it is generally more or less contracted near the middle of the basal margin, but this character decreases as the shell increases in size, until it disappears entirely in the adult state. It is in other respects variable in form and proportion, the beaks are rarely placed so far back as to be parallel with the tip of the posterior margin; it much resembles *Mytillus rugosus* of Lin. but appears to be a much thicker shell. It is generally imbedded in our large *Thethya*, Lam. and not unfrequently intervenes

between the substance of the thethya and the sides of a large *ascidia*, which also attaches itself to that animal. It is also sometimes found in a species of spongia. *Pinnotheres byssomia* of this Journal, inhabits this shell. The young shell is furnished with a prominent incrassated hinge tooth, which closes into a corresponding depression in the opposite valve; but this tooth disappears with age.

It is referrible to the genus *Pholeobia* of Leach.

PETRICOLA, Lam.

SPECIES.

P. **fornicata*. *Shell* transversely elongated, posterior side very short; anterior side a little gaping; hinge and basal margins subparallel; *valves* longitudinally radiated with elevated lines, which, anterior to that which terminates at the middle of the base, are alternately more or less prominent, filiform, and all posterior to that line are fornicated costa; concentric wrinkles numerous, more remarkable on the anterior margin; *lunule* ovate-acute, simply sculptured with the concentric wrinkles; *within* radiated with strongly indented lines, which, on the anterior margin, are obsolete; *teeth* two, rarely three, on each valve, one of which is bifid at tip or grooved on the inner side, and the other usually not prominent above the margin.

Length three-fifths of an inch.

Width one inch and seven-tenths.

Thickness eleven-twentieths of an inch.

Inhabits the coast of North America.

Cabinet of the Academy and Philadelphia Museum.

This shell, which has very much the aspect of a *Pholas*, is not uncommon, but is more abundant on the southern coast. It approaches *P. pholadiformis* of Lamarck, but differs in not being "subglabrous before."

PHOLAS, *Lin. Lam.*

SPECIES.

1. *P. *oblongata*. Shell thin, white, transversely much elongated; basal and hinge margins nearly parallel; anterior and posterior margins rounded; valves transversely and longitudinally striated, the striae muricated and elevated upon the anterior side into costæ, which are more prominently and densely muricated; hinge callous polished, minutely striated transversely and longitudinally, and with about twelve cells, anterior to which is a recurved margin of the shell, forming a cavity; dentiform process dilated, incurved, spoon-shaped, emarginate on the posterior side, and irregularly truncated at tip.

Greatest length, one inch and one-fifth.

Breadth, four inches and two-fifths.

Inhabits Georgia, Carolina, and East Florida.

November 182

Cabinet of the Academy and Philadelphia Museum.

Very common on the southern coast, penetrating compact mud or clay. Small clods of this clay are often rolled ashore by the waves, either containing this species, or exhibiting proofs of having been its habitation, by the numerous perforations with which they are distinguished. In many places, where a bed of this mud is bared by the reflux tide, these shells may be seen in considerable numbers, with a portion of the smaller side appearing above the surface. It is proportionally broader than the shell figured by Lister, plate 423, and it seems to be allied to *P. campechensis*.

2. *P. truncata*.—*Shell* white, transversely oblong, sub-pentangular; anterior margin rostrated, obtusely cuneiform in the middle; posterior margin broadly truncated at tip; *valves* transversely wrinkled and longitudinally striated, muricated, particularly on the anterior side, with small erect scales, which are not arched beneath; posterior margin, from a line extending from the beak to the inferior angle of the truncature, destitute of the striæ and mutic; *hinge callous*, formed of the duplicature of the hinge margin, and destitute of cells, a small tooth upon the inner margin, projecting backward; *dentiform process* curved, prominent, slender, flat.

Length, three-fourths of an inch.

Breadth, one inch and seven-tenths.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

A common shell. Pennant, in his observations upon *P. parva* says, "I have a piece (of wood) filled with them, which was found near Pensacola, in West Florida." May not this have been the young of our *truncata*; or have we in reality the *parva* to add to our catalogue? Pennant's figure (volume iv. British Zool. pl. 40, fig. 13,) of that species does not represent a truncature at the posterior side of the shell; otherwise ours might be supposed to be a variety of it, although it attains to a much larger size.

3. *P. *cuneiformis*.—*Shell* subcuneiform; *anterior margin* nearly closed, transversely truncated from the hinge; the surface transversely striated in an undulated manner, with elevated, minutely crenate lines; the interstitial lines smooth; these lines partially interrupt a profoundly impressed longitudinal sulcus, which passes from the beak to near the middle of the base; the inferior portion of this margin is destitute of striæ; *posterior margin* attenuated by nearly rectilinear edges, to a rounded tip; surface transversely wrinkled; *hinge callous*, composed of the reflected margin, which forms a cavity before, and is destitute of cells; *dentiform process* incurved, slender, filiform; *hinge plate* ovate-triangular, with a short projecting angle on the anterior middle, and subacute behind; *within*, disk slightly contracted by an elevated line corresponding with the external sulcus.

Length nine-twentieths of an inch.

Width four-fifths of an inch.

Inhabits the southern coast.

Cabinet of the Academy and Philadelphia Museum.

Is often cast ashore in old wood, which it penetrates. It bears some resemblance in form to the shell represented in the Encyc. Method. t. 170, fig. 5, &c. Its longitudinal sulcus is very similar to that of *P. crispata*, but in many other respects it is closely allied to *P. pusillus*, and like that species, it is distinguished by two elongated lamellar plates, which cover the sutures of the posterior junctions of the valves.

TYPE AND CLASS,

ANNULOSA CIRRIPEDES.

FAMILY BALANIDEA.

*CONOPEA.

GENERIC CHARACTER.

Shell sessile, fixed, composed of two cones joined by their bases, the lines of junction carinate each side ; inferior cone entire, attached by its anterior side and tip to marine bodies ; superior cone formed of six united pieces, with an aperture at the summit, closed by a quadrivalved operculum.

SPECIES.

*C. *elongata.* Shell elongated before and behind into compressed processes; posterior valves of the operculum, more prominent and truncated at tip.

Inhabits the southern coasts on *Gorgonia virgulata*. Lam.

Cabinet of the Academy and Philadelphia Museum.

Anterior and posterior processes very much compressed. acutely edged above and beneath, and usually as long as the body of the shell; shell generally covered with a dirty-brown epidermis, beneath which it is white, with rufous clouds and lines; posterior valves of the operculum larger, more prominent, truncated or widely emarginate at tip.

Balanus galeatus an inhabitant of the Asiatic ocean, a species long known, and described by various authors, is congeneric with the species here described. The peculiar characters of these shells, their general appearance and their habitat, will not admit of their being referred to the genus *Balanus* in a perfectly natural arrangement. I have therefore thought it necessary to frame the present genus for their reception.

The anterior process of the *elongata* is generally acuminate and longer than the posterior one, which is more compressed, and is generally more or less elevated from the branch of the *Gorgonia*, upon

which the anterior process and the basal cone are firmly attached.

Bruguere informs us that the *galea* is obtained from great depths in the ocean only; but I have found the *elongata* in considerable numbers in inlets of the bay of Charleston, on *Gorgonia*, which at the recess of the tide was visible on the surface of the water.

This species, like the *galea*, is often found coated over with the corical envelope of the *Gorgonia*, and the animal destroyed, probably by its encroachment.

CORONULA, *Lam.*

SPECIES.

*C. *dentulata.* *Shell* depressed-conic; *base* oval; height equal to about one-third of the base; *valves* and *interstices* smooth, the anterior valve largest, and the posterior one smallest; *operculum* transversely striated, the posterior pair of valves with a submarginal impressed line. from which to the edge, are drawn three or four other impressed lines.

Found on the Clypeus of *Limulus Polyphemus*.

Collection of the Academy and Philadelphia Museum.

The posterior margins of the posterior valves of the operculum, are divided by the impressed lines, into three or four broad, flat, dentiform divisions, which, however, but simply crenate the edge.

Geological Sketches of the Mississippi Valley, by
EDWIN JAMES. *Read Oct. 8, 1822.*

We offer a hasty sketch of the Geology of the Mississippi Valley, in anticipation of a more detailed account, which will be given in the Journal of the Exploring Expedition, about to be published in this city. In the accompanying sections, delineated by Major Long, it will be perceived little attention has been paid to the horizontal scale. Wishing to exhibit, in a small compass, the outline of our idea of the structure of different groups of mountains, some wide and uninteresting plains as that between 5° and 12° W. in the northern, and that between 11° and 13° in the southern section, have been omitted. Particular attention has been bestowed in adapting the delineations to the scale of elevation, according to such estimates as we have had the means of making.

The inclination indicated by the lines between the formations is not to be considered applicable to all the strata constituting those formations; as, in the instance of the coal in the southern section of the Alleghanies, the strata of sandstone and bituminous slate are nearly horizontal, but they occupy the several stages of elevation indicated by the inclined line in the section. The lines, therefore, should be considered as indicating the position of formations rather than the inclination of strata.

In the southern section of the Ozark mountains, the inclination of the strata is usually towards the south or south-east, but more irregular in direction than in the Alleghanies.

It is proper to remark, that the coal strata in that part of the Alleghanies represented in our northern section, are extensive and rise nearer to the summit of the mountains than in the southern, though, in the delineation, this and some other circumstances of minor importance have been omitted for the sake of simplicity.

NORTHERN SECTION.

The argillaceous sandstone, and the blue horizontal limestone, extend westward from the summit of the Alleghany mountains to the Mississippi. These are in immediate connexion, sometimes alternating with each other, and often containing extensive beds of coal accompanied by strata of bituminous clay-slate. They are the two most important members of the great coal series of the valley of the Mississippi. The sandstone is most frequent, and occurs usually below the limestone; towards the east it passes into the inclined sandstone and wacke of the Alleghany mountains.

Near the Mississippi in longitude 13° W. from Washington, is a remarkable stratum of yellowish white or light gray sparry limestone, rather indistinctly stratified, but disposed horizontally and containing numerous organic relics. It is connected with the carboniferous sandstones, and sometimes passes into the common compact blue lime stone. Associated with it is an extensive stratum of an homogeneous siliceous rock resembling the petrosilex of some mineralogists, and these two in the parallel of our north-

ern section, form the basis of a peculiar, metalliferous, and in some parts, elevated range called the Ozark mountains.

West of these mountains, in about longitude 19° W. is the commencement of the Great Desert, a region of granitic sands, consisting of the detritus of the Rocky mountains, and extending westward to the base of that range.

In longitude 28° W. a narrow crest of argillaceous and ferruginous sandstone, the latter of an intense red colour, emerges from beneath the deep and loose sands of the Platte, reposing in a highly inclined position against the granite of the Rocky mountains.

In this latitude, the Rocky mountains, on their eastern side, are almost exclusively of granite, in which a reddish yellow feldspar is predominant and hornblend supplies the place of mica. About the lower parts of the mountains, mica occurs in small quantity, and is usually of a very dark colour.

SOUTHERN SECTION.

The eastern declivity of this range of mountains in latitude 35° N. the parallel of the southern section is covered by extensive formation of porphyritic and amygdaloidal greenstone and other rocks called Floetz trap by some geologists. Here, as in England, Germany and many parts of Europe, these rocks are in immediate association with the coal strata, on which they are sometimes superimposed in immense

mountain masses. Their absolute elevation within the region under consideration, has not been ascertained, but is probably in some points little less than 8000 feet above the Atlantic ocean.

The space between 25° and 21° W. is occupied by a red muriatiferous sand stone, containing gypsum, and in many respects closely resembling the sand stone of various rock-salt formations. Rock-salt has not as yet been discovered here, but large masses of chrystallized salt are frequent.

An arm of the sandy desert extends between this sandstone and the coal strata along the western side of the Ozark mountains in longitude 18° W.

The secondary deposits about the sides and summits of the Ozark mountains, embrace several extensive strata not common to other parts of the basin of the Mississippi. These repose on an inclined sandstone like that of the Alleghany mountains. Between the rock last mentioned and the granite is interposed a stratum of clay-slate, highly inclined, and resembling the primitive clay-slate of New England. The granite of this interesting range of hills is, as yet, but little known. It breaks through the superincumbent strata in a valley called the Cove, about fifteen miles south east of the Hot Springs of Washita.

The western slope of the Alleghany mountains is believed to be nearly similar in character, at the two points contemplated in the sections, except that in the southern the primitive rocks rise to a great elevation, but do not appear in the other.

On a Quadruped, belonging to the order Rodentia,
by THOMAS SAY. Read Nov. 5, 1822.

In the valuable collection of the Philadelphia museum, there is the prepared skin of a mammiferous quadruped, exhibiting at first view the appearance of a gigantic rat, somewhat larger than a rabbit, and known in that institution by the name of *long-tailed Cary*; a designation founded upon the belief of its being either the *Chloromys acuchi*, or an undescribed analogous species.

It was brought to the museum more than twenty years ago, either from South America or one of the West Indian islands, and from that period to the present it has been open to the inspection of the curious.

More recently a living specimen of the same animal was presented to the museum, which afforded the proprietors an opportunity of becoming acquainted with the habits of the species in a state of domestication.

According to the observations of Mr. F. Peale, it was lively and active, and would climb trees with much agility. Almost any kind of vegetable food appeared to be grateful to its palate, but meat was always promptly rejected. Inoffensive in its ordinary demeanour, and evincing no disposition to escape, its boundaries were only limited by the walls of the museum, and it was permitted to rove freely through the apartments. It retreated from the too near approach of strangers, but at the same time evinced a degree of gratitude towards the hand from which it

received its regular food : and when the door keeper, Mr. Wilson, was observed by the animal to be eating any vegetable food, it would leap upon his lap and partake with him ; on these occasions and when food was laid upon the floor, it displayed its prowess by appropriating it to itself to the exclusion of a large Cavy (*Cavia magellanica*,* Turton. *C. patachonica*, Shaw) whose freedom was commensurate with its own.

When eating it sat erect, and conveyed food to its mouth like a squirrel, or other animal whose organization is distinguished by clavicles : and when closely observed was sometimes seen to devour its own alvine secretions, recently excluded, even when furnished with a superabundance of food.

I shall in the first place state the characters of a new genus, which I have constructed for this animal, and afterwards note its difference from and correspondence with other genera to which it seems to be allied.

**Genus. Dolichotis* of Desmarest. This animal had the singular habit of resenting the obtrusive caresses of strangers, by rearing upon its hind legs, and discharging a sudden and copious jet of urine upon them ; females and children were more generally the objects of this disagreeable salutation.

This specimen does not at all agree with either of the Cavy's mentioned by Buffon, Gmelin, D'Azzara or Cuvier, but it agrees tolerably well with the description of the Patagonian Cavy, by Pennant.

ORDER RODENTIA.

GENUS* ISODON.

ARTIFICIAL CHARACTER.

Clavicles perfect ; molares sixteen, prismatic, not divided into radicles ; toes divided.

NATURAL CHARACTER.

Clavicles robust, perfect ; *incisores* not narrowed at tip, but very obtusely rounded ; their transverse section presents a triangular figure, of which the angles are rounded ; *molares* sixteen, the two series in each jaw converge a little towards the front, and consist of four teeth in each series, prismatic, not divided at base into radicles ; their crowns flat, and traversed equally from the base to the summit by lamina, which on the summit and base of the tooth terminate precisely alike, in zigzag lines, and are the effect of the sides of the tooth being folded deeply inwards transversely and with but little obliquity ; the inner angles of the folds attain or surpass the centre of the width of the grinding disk, and do not oppose, but pass between the angles of the opposite folds ; each molar of the superior jaw has two folds on the exterior and one on the interior side, and of the inferior jaw there are two folds on the interior side and only one on the exterior ; the interstices are filled near the summit with a cortical substance, but at the base they are void ; the form of the grinding surface of the mo-

lares is quadrate, that of the two intermediate ones of each series particularly; the anterior molares are a little oblong, those of the inferior jaw terminate before in an angle; the posterior tooth of each series is somewhat rounded behind; *fore feet* 4-toed, with a small tubercle instead of a thumb; *hind feet* 5-toed; the toes are all divided, and rest equally on the soil in walking.

SPECIES.

I. *pilorides*, colour black, intermixed with testaceous on the top of the head, back, sides, posteriors and outsides of the legs; the hair of these parts being pale cinereous at base, then deep black, then testaceous, the tip black; on the sides, particularly in the region of the shoulders, are a few remote hairs, which are white and somewhat thicker than the others; front, sides and inferior portion of the head and of the neck, breast and line down the abdomen, gray: *ears* rather small, obtusely rounded at the tip; *vibrissæ* long, black, gray at the base; a few black bristles above the eyes; *eyes* moderate; *anterior foot* with the intermediate toes longest, equal, exterior toe shortest but nearly equal to the inner one; *thumb tubercle* small; *posterior feet* with the three intermediate toes subequal, the exterior and interior are rather shorter and the latter shortest; *nails* robust, black; *tail* thick at base, gradually tapering to the tip, imbricated with scales, hair short, sparse, rigid.

Length from the tip of the nose to the base of the tail	19 $\frac{3}{5}$ inches.
Length of the tail	8 $\frac{3}{5}$
Length of the ears	$\frac{9}{10}$

Dimensions of the cranium.

Length from the anterior edge of the alveoles of the incisores to the tip of the occipital condyles	3 $\frac{1}{2}$
Length from the anterior angles of the alveoles of the incisores to the tip of the occipital crest	3 $\frac{3}{4}$
Distance between the most remote points of the zygomatic arcs	4 $\frac{17}{20}$
Shortest distance between the orbits	1
Between the tips of the orbital spines	1 $\frac{1}{5}$
Length of a series of teeth	$\frac{4}{5}$ nearly.
Width of the largest tooth	$\frac{1}{5}$
Length from the anterior edge of the alveoles of the incisores to the foramen magnum	3 $\frac{1}{4}$
Longitudinal diameter of the foramen magnum, rather more than	$\frac{2}{5}$
Transverse diameter of the foramen magnum across the middle, rather less than	$\frac{1}{10}$
Vertical diameter of the large foramen before the eye	$\frac{3}{5}$
Vertical diameter of the entrance to the large foramen	$\frac{7}{10}$
Transverse diameter of the orbit	$\frac{3}{5}$

Greatest vertical width of the zygoma-
arch behind the orbit - $\frac{1}{2}$ of an inch.

Observations. The occipital crest is but little elevated on the sides, and not at all on its vertex, at which point it is the most prominent backward in the form of a very obtuse angle; it is not undulated on the sides. The zygomatic arches, in consequence of their breadth, have their inferior edge nearly in a line with the crowns of the two series of upper molares, and terminate in a prominent angle pointing backwards.

Lower jaw.

Length from the inner edge of the alveoles
of the incisores to the tip of the spi-
nous process - - - - - $2\frac{3}{10}$ inches.
Length from the latter to the summit of the
condyle, nearly - - - - - 1
Length between the centres of the articula-
ting surfaces of the condyles $1\frac{1}{3}$
Greatest basal width - - - - - $1\frac{1}{2}$
Coronoid process - - - - - $\frac{1}{3}$

Bones of the extremities.

Length of the clavicle - - - - - $1\frac{3}{10}$
Length of the humerus, nearly - - - - - $2\frac{1}{2}$
—————ulna - - - - - $2\frac{3}{4}$
—————radius - - - - - $2\frac{1}{10}$
—————femur - - - - - $3\frac{3}{10}$
—————tibia - - - - - $3\frac{1}{4}$

As this animal exhibits the character of flat crowned teeth, altogether destitute of radicles, combined with robust and absolutely perfect clavicles, it is by the latter character at once excluded from Cuvier's second division of the Rodentia, which comprehends *Lepus*, *Lagomys* and *Histrix*, together with the several genera formed on the demolition of the Linnean genus *Cavia*.

Of the two divisions, therefore, into which the Rodentia have been separated, from the consideration of the presence or absence of perfect clavicles, the new genus *Isodon* unquestionably belongs to the first and may be grouped with *Arvicola*, *Fiber*,* and *Georychus*. It corresponds with the former, in the entire and prismatic form of the teeth. But in these genera each jaw is furnished but with six teeth, which is a smaller number by two than exists in our animal; and as this numerical character is undoubtedly essential, we are justified in regarding it as distinct

* Illiger enumerates four molares to each series in the jaw of *Fiber*; but, after ample examination, I agree with Daubenton and Cuvier in asserting that but three exist; of these the grinding surface of the anterior one in the lower jaw is as long as the two others taken together, and is divided into nine triangular prisms, of which the anterior and posterior ones extend the whole width of the tooth, whilst the seven other prisms are smaller and alternate; in neither of the other molares of either jaw does the number of prisms exceed five. Each of these molares is certainly divided into two parts at base, though it is true these roots are not solid.

from either. In numerical dentition, however, *Isodon* agrees with *Castor*, *Bathyergus* and *Helamys*; but without resorting to a detail of other discrepancies, the manner in which the folds of enamel are arranged in its teeth, very sufficiently distinguishes it from either.

Having thus stated the characters by which *Isodon* is distinguishable as a genus from the various genera of the *Rodentia*, amongst which it claims a situation from the circumstance of its possessing clavicles, I shall, for a moment, dispense with the consideration of these important appendages, for the purpose of comparing it with that section of the order, in which the clavicles are rudimental both in their form and functions.

In this section, after passing over *Hystrix*, *Lepus* and *Lagomys*, as claiming only a remote and ordinate alliance, we shall discover some points of resemblance in one of the several genera into which the *Linnaean Cavys* have been judiciously distributed.

Of these *Hydrochærus*, *Anoema*, and *Chloromys* of *Erxleben* and *F. Cuvier*, are in common distinguished by the number of toes, of which there are four on the anterior foot and but three on the hind foot; in the first and second of these genera the molar teeth are very remarkable and peculiar. In *Chloromys* the folds of enamel in the molares seem chiefly confined to the superior portion of the tooth, and proceed inward and downward into its substance, so that when, in consequence of the attrition of masti-

cation, the tooth becomes much worn, the folds of enamel are insulated from the sides of the tooth, and represent elongate-oval figures on the disk, that gradually diminish in size with the advancing age of the animal. The corresponding teeth of *Cœlogenus*, equally participate in this property. The attrition of mastication, on the contrary, produces no visible effect whatever, in modifying the configuration of the folds in the teeth of the animal under consideration, for these are precisely similar at the end of the tooth which rests upon the bottom of the alveole, as at the grinding surface; and in this respect, agreeably to preceding observations, corresponding with *Arvicola*, and, I may also add, with *Pseudostoma*.*

But *Cœlogenus*† differs from all other Linnæan *Cavys*, and agrees with *Isodon* in the number of its toes, though this coincidence is not extended to the proportions of these members to each other, their inner toes being small and weak, and those of the posterior feet being raised a little from the earth, aid but little, if at all, in supporting the body; whereas those of the subject of this essay, all press firmly and effectually upon the soil in walking.

These traits of resemblance, however, are either

* Long's expedition to the Rocky mountains, Vol. I.

† A cranium of *C. fulvus* of F. Cuvier, in the Philadelphia museum, corresponds, in its remarkably eroded appearance, with that of the French museum, as described by that author.

too remote or too general to assure us of any direct affinity, and we are to seek in the configuration of the cranium of this animal chiefly for a similarity with the Cavys that really exists; I refer particularly to the enormously dilated foramen, before the orbit of the eye, the unusual width of the zygomatic arch, combined with the width of the frontal bones, which are almost undiminished by the orbital cavities, and the form and curvature of the inferior jaw. This dilatation of the anterior foramen may be recognised, though in a less degree, in the common Guinea pig as it is improperly called, (*Anæma*, F. Cuvier.) But were all the characters arrayed in the above comparison, far more strikingly coincident than they really are, we should, nevertheless, regard them as insufficient to establish a generic identity; for “it is impossible,” says Cuvier, “to find any common and positive character of those animals which Linnæus and Pallas have united together under the name of *Cavia*, excepting that of their imperfect clavicles.” I would, therefore, conclude, as the consequence of this comparison, that *Isodon* forms a more intimate medium of connexion than we have hitherto possessed, between the old genera and of *Mus* and *Cavia*.

I have been led to make the foregoing comparisons with genera already established, in order to show that a reference of this animal to either of them would be unnatural and injudicious in the present state of zoological knowledge, and to convince myself and others that if it has been assigned to any place in the

system of which Cuvier has exhibited a condensed view in his *Regne Animale*, such a disposition must have been made without a proper investigation of character, and made in error.

From the circumstance of several specimens of the *Isodon* having been, at different periods, presented to the Philadelphia museum, we are led to believe that it is by no means rare in its native country, and that, consequently, it has not escaped the observation of the naturalists of Europe.

In consequence of the existence of this probability, I have carefully examined all the accessible descriptions of the *Rodentia*; but I found myself unable to identify this animal with any one of them with a degree of certainty, and without conceding too much latitude to the signification of descriptive language.

There is, however, one animal of those mentioned by zoologists, and I think only one, which can be regarded as equivocal in this enquiry; I mean the *Mus pilorides* of authors, which is so imperfectly known, that Cuvier was unable to assign it a distinct place in his *Regne Animale*, and we are informed by Desmarest that Erxleben *supposed* it to belong to the Linnæan genus *Cavia*.

This species was described by Pallas and Brisson as being white, with a somewhat long, cylindrical, naked, scaly, truncate tail, and its native country was stated to be India. The animal, however, to which I have more particular reference, as possibly specifically identical with *Isodon*, was placed by

Gmelin as a variety of the *pilorides*. It was obscurely mentioned or described under the several names of musk rat of the Antilles, wood rat, musk cavy, pilosi and castor, by Du Tertre, Brown, Buffon, Pennant and others, who inform us that it is of a black or tan colour above, and white beneath, and that it diffuses a strong odour of musk ; the former author states that their form is similar to that of the European rats, and that the weight of four rats is not equal to one of these. The *pilorides* is also described as having large naked ears, the anterior feet 4-toed with a tubercle instead of a thumb, posterior feet 5-toed, tail 4 inches long, and as being in size equal to a rabbit.

These concise and insufficient characters agree tolerably well with the specimen under consideration, excepting the attributes of large ears and short tail. But another author,* quoted by Buffon, assures us that the form of the *pilorides* is very unlike that of "large rats of other countries;" an observation apparently at variance with the above mentioned remark respecting their form by Du Tertre.

In this state of uncertainty, and in order to avoid the danger of accumulating still more the already redundant synonyma, I have thought proper to apply the name of *pilorides* to the "Long-tailed Cavy," of the Philadelphia museum.

* Histoire Naturelle des Antilles, Rotterdam, 1658, p. 124.

Dr. Richard Harlan who examined the internal structure of the *Isodon*, has furnished the following observations: "On dissection, the most remarkable appearance observed in the interior organization of this animal, was the liver, which seemed to differ widely from that of any other animal. more especially of the order *glires*. 1st. It is divided into four lobes, two right and two left, the former the largest; the gall bladder occupying the usual situation. Throughout the whole surface this organ presented an innumerable crowd of lobules, generally of an irregular quadrangular figure on the surface, formed by grooves or fissures of from three-tenths to seven-twentieths of an inch in depth.

"This appearance could not have been either the effect of disease or malconformation, as the peritoneal or living membrane of the liver, dips down into the fissures, similar to the pia mater in the convolutions of the brain.

"On reference to Cuvier, we find the greatest number of lobes or lobules in the order *glires* does not exceed seven, and nothing similar to this anomalous structure, except, indeed, in a portion of the liver of the hornless ruminants; in which family we find in the middle of the base of the liver, a very distinct lobe resembling the *lobulus spigelii* of man." "All the inferior surface of this viscera, says Cuvier, (*Lec. de Comp. Anat.* vol 4, p. 13) is divided by deep grooves, running in various directions, forming a crowd of lobules."

I am indebted to Mr. Titian Peale for a very accurate drawing of this animal, with its accompanying details, which are exhibited on the annexed plate.

fig. 1. *Isodon pilorides*.

fig. 2. Liver—a. Gall bladder. b. Portion of the diaphragm.

fig. 3. Cranium.

fig. 4. A row of teeth.

fig. 5. Tooth of the superior jaw. a. Exterior view.
b. Interior view. c. Anterior side.

Description of a Squalus, of a very large size, which was taken on the coast of New-Jersey. By C. A. LESUEUR. Read Nov. 5, 1822.

During the two or three last weeks, an enormous cartilaginous fish of the family of the Squali has been publicly exhibited in this city, under the deceptive name of “Leviathan or Wonderful Sea Serpent;” and in order the more effectually to attract the attention of the multitude, the long appendices which generally distinguish the male, and which accompany the ventral fins, were declared to be feet. This individual is analogous to several others of its proper genus, which, on the 21st of November, 1810, were enclosed by some fishermen’s nets on the coast of Normandy, and which were afterwards taken to Dieppe for sale. The largest of these, which measured 29 feet 4 inches in length, and 16 feet in cir-

cumference at the base of the dorsal fin, was transported entire to Paris, where it was carefully examined by Mr. Blainville, who published a detailed account of it in the *Annales du Museum* to. 18, p. 88, pl. 6, fig. 1.

The individual now exhibiting, having appeared on the coast of New-Jersey nearly at the same season that the reputed "Sea Serpent" was introduced to the attention of the public, the preceding year, it was believed to be no other than the same animal.

The anticipation of a lucrative exhibition of this animal, animated the courage of many of the inhabitants of the coast, and determined them to attempt its capture. Armed with muskets and harpoons, they attacked the animal at 7 o'clock in the evening, and continued their efforts to subdue it until the following morning, when, having received numerous balls and harpoon wounds, it finally grounded upon the shore of Brown's point, when it became evident that they had been contending, not with an enormous serpent, but with a gigantic shark.

The liver yielded four barrels of oil, of about 32 gallons each. The skin, already injured by the numerous wounds, was still further mutilated in several parts in separating it from the body ; it was, however, at length, extended upon a frame, which imitated the form of the animal, though the attitude is forced, the branchial openings too widely extended, the head too much elevated, and the mouth so much expanded as to admit a man in a sitting posture.

Notwithstanding these inaccuracies however, much credit is due to the individual who prepared this skin, as it presents a good idea of the form and magnitude of this elephant shark.

The following description and remarks were made of the animal in the state above described :

Body fusciform, more elongated towards the tail than the *S. Peregrinus*, described by Mr. Blainville, Ann. du Mus. d'Hist. Nat. tom. 18, p. 88, tab. 6, fig. 1.

Total length, when recent 32 feet 10 inches, circumference 18 feet—of the dried skin 22 feet, and 9 feet 7 inches and 4 lines in circumference.

Skin rude to the touch, particularly on passing the hand forward, being covered with numerous small, horny, somewhat curved points, of the length of about one-third of a line. These small points are assembled in groups so as to form numerous undulated abbreviated bands, united at their extremities and again dividing; their breadth, on the middle of the body, is about two lines, and they give to the whole surface the appearance of being wrinkled; these bands or wrinkles are transverse on the whole body from the termination of the branchial openings to the posterior extremity of the caudal carina, where they disappear; on the head, throat, and behind the spiracle they are longitudinal, upon the branchial lamina and above the pectoral fins they become oblique, on the latter their direction complies with the movement of the articulation of the fins; all the fins are

destitute of wrinkles, the appendices which accompany the ventral fins are rugose and transversely wrinkled on their superior part, and longitudinally wrinkled on the middle; these wrinkles are more profound than those of the skin of the body. *Head* very small; *rostrum* very short, obtuse, glabrous, covered with mucous pores of different sizes, the largest ciliated at their interior circumference and placed before the eyes, the middle sized ones irregularly disposed, covering the upper part and sides of the rostrum, the small ones are arranged on a line which passes above the eyes and is prolonged in front of the rostrum; *eyes*, these being replaced by a hollow hemisphere of glass filled with plaister, with a round black spot in the middle, I was unable to ascertain their true form and dimensions; they are at the distance of about $6\frac{1}{2}$ inches from the tip of the rostrum, and very near to the margin of the superior lip; *nostrils* placed before the eyes and beneath the rostrum, but having been distended with cylinders of wood, their form cannot be determined; *spiracles* very small, placed above and a little behind the angle of the jaw, each corresponding with a long interior opening in the mouth between the superior jaw and the first branchial opening; *branchial apertures*, five on each side, the anterior ones the largest, extending from the superior part of the neck to the under part of the breast, where they appear confluent with those of the opposite side, the posterior opening smallest; the space between the first pair on the upper part of

the neck is 3 inches and 4 lines, that between the fifth pair is about 2 feet 18 lines; *mouth* very large, 1 foot 7 inches between the angles, and 2 feet 10 inches from the tip of the inferior jaw to a central point between the nostrils; the jaws armed with teeth of different forms, those of the superior jaw occupying, on each side, a space of 1 foot and 6 inches in length by more than one inch in width, and the armed space of the inferior jaw on each side is 1 foot $8\frac{1}{2}$ inches long by 1 inch wide; *teeth* generally curved and turned inwards towards the throat, their sides slightly edged, without any appearance of distinct and regular serratures; some small rugosities, only, are perceptible on the edge; *on the superior jaw* they are subconic at the anterior extremity and at the angle of the mouth, both of which are smaller by one-third than those which occupy the intermediate space, and have but a single point to each, which in the greatest number is flattened and truncated; the four or five last ranges at the angles of the mouth are flattened, subtriangular, and recline upon each other to the number of four or five ranges; the intermediate teeth are larger, of the length of about 4 lines, by 3 lines in width at their bases, they are subtriangular, with one or two grooves on their exterior face, which indicate the union of three points of which they appear to be composed, two of these points are united, and the other is often detached, and very distinct, presenting a bifid appearance, some of the teeth exhibit three points, but these are rare; *on the inferior*

jaw the teeth are rather larger than those of the superior jaw; towards the anterior extremity and near the angle of the jaw they are a little elongated and lanceolate, less conic but somewhat more compressed; the intermediate ones are bifid and subtrifid, those of the anterior extremity are sensibly emarginate; these teeth are not implanted deeply in the skin, and are disposed in 7 or 8 distinct ranges in the middle, the younger ones being on the interior range; *fins* eight; *first dorsal* triangular, a little emarginated, extended to a point, detached posteriorly, and placed equidistant. Between the base of the caudal fin and the tip of the rostrum, its height is 2 feet 8 or 10 inches, length 2 feet 10 inches, including the posterior pointed lobe which is $8\frac{1}{2}$ inches long; *second dorsal* very small, subtriangular, with a posterior lobe detached at tip, its height is $8\frac{1}{2}$ inches and total length 17 inches, it is placed before the line of the anal fin, and at the distance of 3 feet $3\frac{1}{2}$ inches from the base of the caudal; *pectorals* large, placed immediately behind the fifth branchial aperture, at the inferior part of the body, their extremity surpassing a little the base of the first dorsal, they are strong anteriorly, and flexible posteriorly, of the length of 4 feet 1 inch, and 2 feet 1 inch and 8 lines in width; *ventrals* subtriangular, nearly intermediate between the first and second dorsals, anteriorly flexible, and of the length of 1 foot 5 or 6 inches, by 2 feet and 2 inches in width; the two organs, or large, subcylindric appendages which are attached to them are pro-

foundly striated, on their superior portion these striæ are transverse and very rugose, on their middle portion they are oblique, and towards the extremity they have a longitudinal direction and are rugose; these appendices are at present of the length of 2 feet 8 inches, but having been detached from the animal, and in order to skin and prepare them, and again adjusted in their proper situation, their form seems to have been entirely lost, a large groove, however, and two small appendices are still recognisable; *anal* subtriangular, with a detached pointed lobe behind, placed behind the second dorsal, its length is 1 foot 3 or 4 inches, and height 7 inches 6 lines; *tail* 3 feet 3 inches long from the base of the second dorsal to the base of the caudal fin, at which latter point I did not perceive any indentation like those which exist in the *Squalus peregrinus* of Blainville (Ann. du Mus.) and in many other species, as well as in some that we observed on the coast of New Holland; possibly this character may have existed in the animal under consideration, and their absence may be attributable to dessication; *caudal fin* large, straight, elevated, falciform, of the length of 5 feet from the extremity of one lobe to that of the other; superior lobe 4 feet 3 inches and 6 lines long, inclusive of the small triangular lobe at its extremity of 8 inches 6 lines; inferior lobe short and wide; on each side of the tail is a carina of about 1 foot 6 inches or 2 feet long, which crosses the base of the caudal fin.

From this description of the dried skin of this gi-

gantic species, it is easy to perceive the relations of its form to other species which attain to an equal magnitude, such as the *S. Gunnerianus*, *S. Homianus* and *S. Peregrinus*. But it is with the latter and particularly with the individual captured on the coast of Normandy that our species is most closely allied. It resembles it in the form and number of the fins and the vast openings of the branchia; but the form of its teeth are totally different, those of the *S. Pelegrinus* being conic, whilst those of our species are more compressed than conic. I, therefore, propose to distinguish it by the following name and characters:

SQUALUS *ELEPHAS.

Teeth very small, numerous, curved, bicanaliculate, bifid, in the middle of the series compressed, at the extremities of the series subconic, pointed; *spiracles* very small; *branchial openings* very large, the anterior one originating on the upper part of the neck; *body* very large, lead colour, darker on the back and paler on the belly; *second dorsal* almost equal in size to the anal, and placed anterior to it; *tail* long, with a carina on each side.

Note. In confirmation of the statement relative to the indentation or notch on the tail, I here add descriptions of two species which seem to be new.

SQUALUS *SPALLANZANI.—*Peron and Lesueur.*

Spiracles none ; a black spot at the extremity of the pectorals, another at the summit of the second dorsal and a third at the end of the inferior lobe of the tail ; caudal fin undulated above ; pectorals fal-ciform, very narrow, situate under the two last branchial openings ; head very much depressed ; a lunulated emargination above and another beneath the tail.

Inhabits terre de Witt, New Holland.

SQUALUS *CUVIER.—*Peron and Lesueur.*

Head and body very thick ; dorsal moderately emarginate ; irregular blackish spots upon the body from the summit of the head to the caudal fin, which, on its superior portion, is also spotted ; the spots are disposed in three ranges, which are rather irregular on the anterior part ; a lunulated emargination above the tail, and another beneath it at the base of the fin.

Inhabits the N. W. coast of New Holland.

This lunulated emargination, which exists upon the base of the tail of the Squali here described, are also observable on a species of the genus *Caranx*, that Peron and myself examined at the port of King

George in *la terre de Nuyts*, and to which Peron applied the name of the celebrated professor and dean of the school of medicine at Paris, Mr. Le Roux. This species of *Caranx* is of a very large size, covered with moderately elongated scales; dorsal fins two, the anterior small and consisting of five spinous rays; the second low, very long, elevated anteriorly, and composed of twenty-three much divided rays, of which the first is robust, osseous and shorter than the second ray; pectorals with twenty undivided rays; thoracics with seven rays, the three anterior ones osseous, simple; anal entire shorter than the second dorsal, elevated anteriorly, lower on the posterior portion and supported by sixteen rays, of which the first and second are very strong and bony, the others branched; caudal emarginate, of twenty branched rays, the four or five anterior ones on each side are spinous; a carina on each side of the tail and a lunulated emargination on its superior part; jaws equal.

December 1822

*On a South American species of *Æstrus* which inhabits the human body. Read November 26, 1822.*

By THOMAS SAY.

Many of the objects of natural history described by Linné, are at present, entirely unknown, notwithstanding the laborious and ardent researches that have been made, by a multitude of observers, since the time of the great reformer. This may be in part attributed to the great rarity of some of those objects, but it may be supposed to be more particularly due to his habitual manner of attempting to concentrate all the characters of a being, in the comprehensive significancy of a few words. This excessive conciseness, appears to have been intended to check or discountenance a continuation of the habit of voluminous description, so freely used by his predecessors; but with due deference to his vast and deserved reputation, be it said, that, in the attempt to introduce a necessary reformation in this respect, that great naturalist passed to the opposite extreme.

In common with the greater number of naturalists of the present day, I have very often felt the inconvenience of this imaginary improvement and real detriment in zoology, and heartily wish that brevity may be sacrificed to accuracy, as I am convinced that however desirable every describer may, and, indeed, ought to be, to represent the object before him in as few words as possible, he should, nevertheless, not hesitate to avail himself of as many expletives as will in all probability obviously distinguish his object

from others, regardless of the number of words that may be required for this purpose.

It is to be regretted that some very distinguished zoologists, perceiving as they must this grand impediment to the determination of species, still, by their example, perpetuate and increase this grievance, considering it sufficient for them to add to a very laconic description, a reference to a cabinet in which the specimen may be inspected, by the comparatively few persons who have the opportunity.

Now, although a reference to a cabinet specimen ought to be considered as the duty of the describer of every animal, plant or mineral, whenever such reference is at all possible, yet it nevertheless seems also indispensable, that a detailed description, including many characters, should at the same time be given for the information of the distant naturalist or traveller, in order that its utility may not be limited exclusively to our compatriots.

Amongst a multitude of short and insufficient descriptions, or rather indications, we find in Turton's edition of the *Systema Naturæ*, the following notice, translated from Gmelin, of the existence of a very remarkable insect.

"*ÆSTRUS hominis*. Body entirely brown. Inhabits South America. Linné ap. Pall. nord Beytr. p. 157. Deposits its eggs under the skin, on the bellies of the natives; the larva, if it be disturbed, penetrates deeper and produces an ulcer which frequently becomes fatal."

This insect, for the identifying of which we have

manifestly to depend almost entirely on the habitat, does not appear to have been observed by any succeeding writer since it was mentioned by its discoverer. Humboldt, however, when occupied with his highly interesting travels in South America, was struck with certain tumours that he sometimes observed to exist on the bodies of the natives of that country, and which he attributed to the concealed operation of the larva of an *æstrus*; but as he had no opportunity of verifying this conjecture by satisfactory examination, he relied upon the form and appearance of the tumours, with a recollection, probably, of the description above quoted.

Clarke, the best writer on this genus of insects, observes that the *hominis* is probably a spurious species, and he further states that it "is, perhaps, merely an accidental deposit of *Æ. bovis*, in the human body, of which there are numerous instances."*

So perfectly satisfied was Fabricius of the non-existence of the *hominis* as a distinct species, that in his *Systema Antliatorum* he has taken no notice whatever of this name and description.

The most eminent of living entomologists, Mr. Latteille, observes† that neither of the authors who have mentioned this insect, saw it in its perfect state; he therefore thinks it probable, that the larvæ to which they had reference, were those of the *Musca car-*

* Rees' Cyclopædia, article Bots.

† Nouveau, dict. d'Hist. Nat. article *Æstre*.

naria of Linnæus or some other analogous species; for, he adds, all the larvæ of *œstrus* known, live on quadrupeds of the orders Herbivora and Rodentia.

Now, although I have not seen the perfect insect in question, yet my object in this paper is to show, by the aid I think of sufficient data, that there is an *œstrus* of South America which must be added to the catalogue of the foes of our kind, fully capable of a notable agency in augmenting the afflictions of humanity, and to prove that this species is altogether distinct from *bovis*, to which the ingenious Clark was disposed to refer it.

A few days since, Dr. Harlan presented to me for examination, a small animal preserved in alcohol, that resembled, at first view, a parasitic worm, but, on a slight inspection, it became evident that it was no other than the larva of a species of *œstrus*; he informed me that he had received it from Dr. Brick, who had extracted it from his own leg, during a journey in South America.

DESCRIPTION. The form of this larva is clavate, the posterior moiety of the whole length being dilated and somewhat depressed; the segments of this portion are armed with transverse series of small, black, horny tubercles, dilated at their bases, near their tips rather suddenly diminishing to a filiform curved hook, pointing forwards and with an acute termination; these series are six in number on the back and sides, placed in pairs, and three in number on the abdomen; near the posterior termination of the body are

numerous minute tubercles of the same character with the others, excepting that they conform to no regular series; the anterior moiety of the body is entirely glabrous, cylindrical, or rather elongate conic, of a much smaller diameter than the posterior portion, and truncate at the tip; the lips at the posterior termination of the body are short, and the intervening fissure of but little width.

Total length eleven-twentieths; greatest width more than three-twentieths of an inch.

Cabinet of the Academy.

OBSERVATIONS. From this description we may gather the facts, that the larva in question corresponds with that of *Æ. bovis* in being destitute of hooks or holders at the mouth, but it widely differs in general form, as the larva of *bovis* is oblong-oval, hardly more narrowed at one end than at the other. The appearance of the series of minute hooks which subserve the functions of feet, in the latter species also are very different from that of the corresponding armature of this larva, the superior line of each double series being narrow and seemingly composed of but a single row of hooks, whilst the inferior line is much more dilated and the hooks far more numerous than in the superior line; indeed, the series of hooks of the South American larva are more like those of the larvæ of *Æ. equi* and *hæmorrhoidalis*, than those of the imperfect *bovis* or *ovis*. But independently of those considerations, the single character of the much attenuated form of the anterior part of the body of this larva, at once and eminently distinguishes it from any

other yet known in this family; while at the same time, the above description, taken in conjunction with its habitat forbid the supposition of its belonging to any other group, and will, I think, justify the restoration to its place in the system of the Linnæan *æstrus hominis*. To which of Latreille's recently established genera it belongs, is at present impossible to determine, though, for the present, it may, perhaps, be not unsafe to refer it to the *Cutebra** of Clark.

Since the above was read to the academy, Dr. Harlan has furnished me with the following interesting extract of a letter, which he received from the gentleman from whose leg this larva was extracted :

“After a very sultry day's march, and being very much fatigued, I went to bathe in the Chama, a small stream emptying in the lagoon of Maracaibo. Not long after coming out of the water, I received a sting from some insect, in the left leg, over the upper and fore part of the tibia; it was several days attended with a considerable degree of itching, but without any pain, and I continued on my journey some few days longer without experiencing much inconvenience, except during several periods of perhaps two or three minutes continuance, when an acute pain came on suddenly, and was severe whilst it continued, and then as suddenly subsided. On my arrival and during my continuance at Il. Rosario de Cucuta, I walk-

* Weidemann in a letter states to me his preference of the term *Trypoderma* for this genus.

ed with difficulty ; there was a considerable tumefaction over the tibia, which had the appearance of an ordinary bile (Phlegmon,) in the centre there was a small black speck ; the usual applications were used without any success, and the tumour became more irritated and inflamed, and thus it remained for some days, attended at times with a most acute pain, which for a few minutes was almost intolerable.

“ In returning to Maracaibo, I had to descend the Cottatumba in an open boat, without any shelter, and being wet to the skin by the cold rains which fell every night, I suffered much, and was almost constantly tormented by the tumour, which became more painful at those particular periods than usual ; during this passage, which lasted for twelve days, I was induced to scarify it, and had recourse to the usual topical applications, but without success. At times I imagined that I felt something moving, and suspected that there was something alive beneath the skin.

“ After my return to Maracaibo I became scarcely able to walk, and was in a manner confined to my quarters. In this situation I continued two weeks longer, the tumour having begun to discharge, and without any diminution of the painful periods.

“ Being now nearly worried out, it occurred to me to try a poultice of tobacco, which was used for several nights, having previously scarified the tumour ; during the day, I frequently dusted it with ashes of segars : as an ingredient I used rum instead of water

in making the poultice. On the fourth morning after this remedy, I felt considerable relief, and on the fifth, with a forceps, I drew out the worm which you have now in your possession, and which was then dead.

“ In a few days the sore assumed a healthy look, and in ten days was perfectly healed up—although, at times, I yet experience a heavy pain in the part from whence the worm has been taken. It had travelled on the periosteum along the tibia for at least two inches. The severe pain which I experienced for those periods, I attribute to the irritation of some of the branches of the nerves distributed to the parts by the worm in its progress. Respecting this worm there are different opinions among the Spaniards and Creoles. *Ouche* is the name it is called by some, who say it is produced by a worm which crawls on the body, from the ground, and penetrating the skin, increases in size. Others maintain that they are produced from the sting of a winged insect which they call *Zancudo*,* others again call the insect *Husano*; for my part I am rather inclined to think that they are produced from the sting of a winged insect which deposits its egg.

“ N. B. Should it even be proven that the form of the anterior part of this larva is owing to the violence used in extracting it, of which there is no appearance, still it will stand as distinct from other known species.”

* The word *Zancudo* is used by the South American Spaniards to denote several species of *Culex*. S.

On two remarkable Hepatic Mosses found in North Carolina, by L. D. SCHWEINITZ. Read November 26, 1822.

In my specimen of North American Cryptogamous plants, published at Raleigh, N. C. last year, I have noticed two Hepatics, which appear to deserve further investigation. One is the *Sphaerocarpus terrestris* of Micheli, heretofore found exclusively in Italy and England, greatly differing from others of the family, by its remarkable thallus and fructification, and still very imperfectly known. The other, altogether new, and no less distinguished, was arranged by me, in the little work just cited, as a second species of *Targionia*, and named *T. orbicularis*.

These two Hepatics, figured in the annexed drawing, I shall now endeavour to illustrate, by such observations and descriptions, as an attentive study, under the compound microscope, has suggested.

1. SPHAEROCARPUS.

SYNONYM. *Micheli. Gen. t. 3. Dillen. t. 78. Schmeidel Icon. t. 28. f. 2. Dicks. Fasc. 1. p. 8. Schwaegrichen Prod. p. 35. Web. Hist. Hep. p. 109. L. D. S. Specim. Fl. Crypt. Am. p. 24.*

GENERIC DESCRIPTION.

Calycibus multis magnis, in fronde minuta fasciculato-aggregatis, globoso-turbinatis, reticulatis, subdiaphanis, apice perforatis, capsulam includentibus.

Capsula in fundo calycis sessili, sphaerica, quadruplo-minori, e membrana tenuissima diaphana confecta, continenti *Sporangia* numerosa e globoso-lenticularia, inter se libera, quasi quadricocca, superficie granulata (a sporis globosis inclusis) ac muricato-exasperata. *Fronde* reticulata, subdiaphana, substantia calycis, etiamque viridissima.

Observations. The *Frons* or *Thallus* of this hepatic is very small in proportion to the large calyces with which it is so entirely overgrown, in densely aggregated clusters, that it can only be distinguished with difficulty. The whole plant, therefore, appears to the naked eye as an aggregate of longitudinally confluent clusters of small green turbinate globular bodies, occupying sometimes patches of nearly an hand's breadth on the earth. On close examination, however, the frons is found to consist of some small thickish, variously lobed leaves, with a few of an ovate, acuminate shape and uniform consistence throughout. The structure of this frons, exactly the same with that of the calyces, consists of a beautiful and curiously wrought network, most generally forming irregular pentagons. The intermediate space between the green pellucid veins, is, to appearance, closed by a thin, slightly concave membrane, which appears only semi-transparent. From the central part of each separate frons, numerous very delicate radicles proceed, forming a dense tuft, very short, however, by which it adheres almost inextricably to the subjacent earth. At all seasons in which I have observed this hepatic—that is to say, from the mid-

dle of November until the summer heat caused it to disappear in May, I have uniformly found the frons thus covered by calyces.

The *Calyx*, if such be the proper term, for the prominently conspicuous part of this hepatic, is a most remarkable globosely turbinate expansion of the frons, of precisely the same consistence, enclosing, as it were, in a capacious hollow space, the capsule, which rests on the inner base or short contracted neck. This expansion, when in full vigour, always assumes a handsome turbinate form, and is open at top by a small round aperture. It is perfectly inane (excepting the capsule at the bottom) and therefore susceptible of being pressed into various shapes by the touch. In colour it agrees with the frons as well as in structure. When the capsule ripens and assumes its dark brown colour, it becomes visible through the semi-transparent calyx, the hollow of which is, however, four times greater than the capsule.

The *Capsule* appears to me to consist of a very thin perfectly transparent membrane, closely filled by an aggregation of rounded sporangia or seed vessels, which are unconnected among themselves, and only held together by this transparent membrane in a sphaerical shape. It is so entirely transparent, that I conceived the sporangia to be nakedly aggregated, until I attempted to separate them by the lancet. In an incipient stage, the colour of the capsule is apparently dark green, which, however, is only owing to that colour of the sporangia at that time; for as these ripen and become brown, the capsule assumes the

same colour. Whether the capsule is really sessile, or whether it rests on a short and thick pedicell, as would appear fig. 1. at e, I have been unable to ascertain with certainty. I suspect the apparent pedicell is but the base of the calyx, considerably thickened in substance, as it is altogether of the same consistence.

The *Sporangia*, or seed vessels, as I am obliged to consider the rounded grains contained in the capsule, when separately submitted to the most powerful lens, present a very remarkable formation. In general they have a roundish lenticular shape, curiously, however, four times impressed above, as if they consisted of four loculae. The sporangium may, on this account, be not improperly termed *quadricocum*, a term applied by Weber to the capsule, possibly only by want of accuracy in his expression. But these apparent four divisions appear to me only superficial. The superficies of each sporangium appears granulated by an infinity of small, sphaerical, yellow, semitransparent grains, which seem to fill the sporangium, and are considered by me as the real *spora*e; besides it is muricately exasperated by a kind of hairy protuberance. Though the *spora*e just mentioned are far too minute to admit of a separate subjection to the microscope, I have no doubt that they are merely aggregated in the membrane, which forms the sporangium, without any essential connexion by a thread, &c. among themselves.

When I first found and began to study this hepatic, in December, the calyces were fully formed and

nearly as large as afterwards, but contained no trace of a capsule. Being carefully opened with a lancet, I plainly perceived on the inner base, which afterwards bore the capsules, a number of small organs, of a purple colour, pear-shaped below and protracted into a small cylinder, bearing great resemblance to the inflorescence of Mosses. I did not, however, succeed in obtaining a correct representation, and when again an opportunity of examination was offered to me, the capsules had already begun to appear. The moss continued in vigour and the capsule grew, until the parching sun destroyed its vegetation. The calyx and frons then assumed a brownish colour, and were much broken and lacerated, as if by exterior action upon them. The sporangia were scattered about and could be easily distinguished among the particles of clay on which the hepatic grew.

I first observed this plant in great quantities on the naked soil of a clayey cornfield, spreading through a great extent between the hills of corn. Since I have met with it on the grassy margins of clayey bogs, but not in such considerable quantity.

In figure 1.

- a. Represents a particle of clay, with a cluster of *Sphaerocarpus*, showing the natural size of the calyces. They may be easily mistaken for young plants of *Gymnostomum*.
- b. Represents a small cluster about double the natural size.
- c. An entire frons with its aggregated calyces,

through which the ripe capsules appear greatly magnified.

- d. One calyx with its included capsule, still more magnified.
- e. A ripe capsule with its aggregated sporangia.
- f. A young green capsule.
- g. Part of a calyx under the most powerful lens, showing the formation and texture thereof, and of the frons.
- h. Represents a single sporangium, with its granular and muricate appearance, and the sporae included.
- i. The internal base of a calyx in its flowering state as imperfectly observed.

In no state did I perceive any thing like a calyptra.

S. terrestris. The only species known.

2. CARPOBOLUS *mihi*.

TARGIONIA ORBICULARIS. *Specim. Fl. Crypt p. 28.*

After I had found the *Targionia hypophylla* in North Carolina in perfect fructification, which was not until after my little pamphlet had gone to press, I subjected that to a very rigid examination and comparison with good European specimens from the vicinity of Dresden and from professor Sprengel of Halle. The absolute identity of the American hepatic with these, was thus established; but at the same time I became convinced that, besides the en-

ture dissimilarity of the frons between it and the hepatic I had arranged as a second species of *Targionia*, there was so great a difference in their fructification, that they could not possibly be considered congeners. As little, however, can the one in question be referred to any other established genus; I am, therefore, under the necessity of proposing it as a new genus, to which I have given the name *Carpobolus*, from the circumstance, that the capsule is protruded from the calyx when ripe.

GENERIC DESCRIPTION.

Capsula oblongo-sphaeroidea compressa desiliienti, apice rima notata (an dehiscenti?) sporis minutis globosis repleta, inter se liberis. *Calyce* majusculo, bifido, erecto aut inclinato, capsula ejecta, inani, persistenti. *Fronde* oblongo-orbiculari, in ambitu varie lobato-plicata; plicis omnibus in centrum convergentibus, marginibus elevatis, crenatis, substantia Anthoceri. Plures frondes confluent, nunquam autem sese invicem superincumbunt.

Observations. The *frons* of this interesting hepatic, is of the consistence and texture of that of *Anthoceros*, or perhaps still more like that of a *Collema*. When wet, it becomes subtremellose, and dries stiffly and brittle, shrinking to a considerable degree. The colour is in general brown, excepting in the outer lobes, which are greenish, and sometimes whole specimens, especially the larger ones, assume the bottle green of *Anthoceros*. Its internal structure is

quite analogous to *Anthoceros*. The form is generally speaking orbicular, very variously lobed around, like a *Collema*, with the plicated lobes all tending towards a common centre. The margin of these lobes is, in most instances, turned up and crenate. From the plicae or folds, arise the *Calyces* in every direction; sometimes a few only on a single frons scattered about; sometimes a great number of them singly, or in clusters. The under side of the frons is thickly clothed with very fine radicles, by which it inseparably adheres to the earth. The lobed circumference, however, is free, but flatly impressed. A single perfect frons is rarely an inch in diameter, generally scarcely half an inch; but a great number are often confluent, so that patches of six or seven inches jointly cover a considerable space. In no instance did I meet with superincumbent frondes; but, as is usual with this family, blades of grass or frondose mosses not unfrequently grow through the mass.

The *Calyx* is a short cylindrical protrusion of the frons, divided into two lobes or divisions, commonly somewhat irregularly lacerated in the margin, and closely pressing around the capsule, farther convexly bent down at top, so as finally to propel the capsule, which appears loose in the calyx. After this falls out, a hollow calyx remains. In a young state, the two divisions of the calyx almost entirely cover the capsule, which, however, always appears at the top, and at length bursts forth in the manner just mentioned.

The *Capsule* is a very regularly oblong sphaeroid,

somewhat compressed and marked on the summit by an indenture or seam longitudinally (probably its final opening, although I never found it open) which is perceptible nearly half down. This capsule consists of a membranaceous rather thick skin, not at all transparent, but of a light brown or yellow colour, and a little reticulate. It is completely filled by innumerable seeds, which are perfectly unconnected among themselves. They are globular, golden yellow and semitransparent. After protrusion from the calyx, the capsules are strewed about and probably discharge their seed by the opening of the seam at top.

This hepatic, covered with its capsules, was found several successive years in the months of December and January on the beds of my bottom garden and the neighbouring ones at Salem, N. C. but no where else. Before the capsules appear, it would most probably be taken for an incipient *Collema*, or *Anthoceros*. When dry and shrunk, the capsules remain very visible, for they are proportionably large, and distinct by their yellow colour.

In figure 2.

- a. Represents a whole frons with its capsules in natural size.
- b. A small fragment of a lobe with capsules, somewhat magnified.
- c. A lobe with ditto considerably magnified.
- d. A protruded capsule } greatly
- e. An empty calyx } magnified.
- f. A calyx with the capsule still within it.

g. A magnified lobe with the capsule in a younger state.

h. A broken capsule, with the seeds scattered about.

N. B. These are free, and the apparent threads only fragments of the capsule.

i. The underside of a lobe.

j. A few sporae or seeds greatly magnified.

k. An obsolete hollow calyx.

l. A calyx almost including the young capsule.

C. *orbicularis*. The only species.



*Description of univalve terrestrial and fluviatile
Shells of the United States. By THOMAS SAY.
Read December 25, 1822.*

The shells described in the following pages, have been discovered since the publication of my last essay on land and fresh water shells.

GENUS HELIX, LIN. LAM. FERRUSSAC.

H. **irrorata*. *Shell* imperforate, depressed-subglobular, pale reddish brown, with very numerous white small spots, and about four deeper brown obsolete bands; *whorls* rounded, nearly five in number, wrinkles obsolete on the body whorl, more distinct on the spire; *spire* depressed, convex; *suture* declining much near the mouth; *aperture* on the side of

the labrum, within somewhat livid ; *labrum* reflected but not flattened, and not abruptly contracting the aperture, white before and yellowish behind, near the junction with the columella is a callus which does not rise into an angle.

Length from the apex to the base of the columella, three-fifths of an inch, nearly.

Greatest breadth one inch and one-tenth.

Inhabits Northumberland county, Pennsylvania. Cabinet of Mr. William Hyde.

This species may be compared with the *H. lactea*, Muller and Ferrussac ; the spire is rather more prominent, the white spots or rather abbreviated lines are similar in form, size, and number, but its labrum preserves the same colour with the exterior of the shell, and the livid tint of the inner portion of the body whorl is very pale, the posterior face of the reflected labrum is immaculate, and its callus base is not angulated ; the aperture is much less wide than that of *lactea* ; and, in Mr. Hyde's specimen, a small fissure remains near the umbilicus. It still more closely resembles a variety of a shell which inhabits the island of Candia, but that species has always a white base, being immaculate beneath the inferior band.

2. *H. *inornata*. *Shell* subglobose, pale yellowish-horn colour, polished ; *whorls* five, rounded, wrinkled ; *spire* convex ; *suture* not deeply impressed ; *umbilicus* small, profound ; *aperture* wide, at the junction of the labia with the penultimate whorl shorter than the width of the mouth ; *labrum* simple.

Inhabits Pennsylvania.

Greatest width less than seven-tenths of an inch.

This species has a strong resemblance to *H. ligera*, but in addition to its superior magnitude, its aperture is proportionally wider, a character which, of course, gives the whorls a greater breadth; the whorls are also fewer in number, and the distance between the terminations of the lips is very perceptibly less than the width of the aperture, the reverse of which obtains in the *ligera*.

3. *H. *indentata*. Shell depressed, pellucid, highly polished; whorls four, with regular, distant, subequidistant, impressed lines across, of which there are about twenty-eight to the body whorl, all extending to the base; suture not deeply indented; aperture rather large; labrum simple, terminating at its inferior extremity at the centre of the base of the shell; umbilicus none, but the umbilical region is deeply indented.

Greatest breadth one-fifth of an inch.

ANIMAL. Blued-black, immaculate.

My Cabinet, and that of Mr. William Hyde. Several specimens occurred at Harrigate, the country residence of my friend Mr. Jacob Gilliams, adhering to stones and logs in moist places. Mr. Hyde obtained many individuals in New Jersey. It may be readily mistaken for *H. arborea*, but it is destitute of the umbilicus, instead of which there is an indented centre to the base, in which the labrum terminates. The spire is very much depressed, and the surface

prettily radiated by distant impressed lines, the interstices being perfectly smooth.

4. H. **lineata*, (vol. 1. p. 18.) On examination of several individuals of this species, I have ascertained that a character exists in this species, that was altogether wanting in the specimen from which I drew out the description published in the first volume of this work. As the shell is somewhat translucent, two pairs of white teeth, remote from each other, may be observed through the body whorl of the shell. One pair of these teeth is placed in the throat so near to the labrum as readily to be seen by looking in at the aperture. These teeth are nearly equidistant from each other and from the extremities of the labrum. The other pair is placed so far within the shell as not to be seen at all from the aperture.

I found several specimens in a humid situation at Harrigate.

BULIMUS. BRUG. LAM.

B. **multilatus*. *Shell* turriculated, pale reddish-brown; *whorls* four, longitudinally striated with irregular elevated lines or wrinkles, which are a little more prominent near the sutures; *suture* not deeply indented; *apex* widely truncated; *labrum* whitish, destitute of calcareous deposit; *body whorl* more than double the width of the truncated apex; *spire* one and a half times longer than the aperture. Length less than one inch; width less than half an inch; length of the aperture two-fifths of an inch.

Inhabits South Carolina, about Charleston.

This curious shell is the first and only species of the genus *Bulimus*, native of the United States, that I have yet seen. I am indebted for it to the researches of Mr. Stephen Elliott, of Charleston, who informs me that it is there found in gardens. In the truncated form of the apex of the spire, this species resembles the *decollata*, *consolidata*, *truncata* and *PUPA torticollis*, &c. but it is sufficiently distinct from the former, to which it is more closely allied than to the others, by its less cylindrical and more conic form, being much more robust in its figure and less elongated; the aperture is consequently wider, and forms a greater proportion of the total length. It does not change to an opaque white after the death of the animal, as the *decollata* generally does.

PUPA. LAM.

1. P. **contracta*. Shell dextral, short, subovate, white; apex obtuse; whorls five; umbilicus distinct; aperture irregularly orbicular, complete, the lamina of the labium being elevated above the surface of the preceding whirl and joining the extremities of the labia; labium with a large, elongated, prominent tooth, which is concave on the side towards the labrum; labrum bidentate; a large tooth or fold far within the throat, caused by the fold of the umbilicus; throat much contracted by the large tooth of the labrum into the form of a horse shoe.

Total length less than one-tenth of an inch.

Inhabits Virginia.

This is a short, wide species, sufficiently distinct from others, and readily distinguished by the lamina of the labrum being much elevated, and by the magnitude of the tooth of the labium. I obtained two specimens at Occoquan under a pile of bricks and rubbish. This species probably belongs to the genus *Carychium*.

2. P. **exigua*. Shell dextral, tapering, oblong, with minute grooved lines; *apex* obtuse; *whorls* five; *suture* deeply impressed; *labium* bidentate, superior tooth situate rather beneath the middle of the lip, inferior tooth small, placed on the columella; *labrum* mutic, reflected, but not flattened; *umbilicus* distinct.

Length more than one-twentieth of an inch.

This is the smallest species that I have seen. Numerous specimens of it were found near this city by Mr. William Hyde, and I have obtained many at Harrigate. Its aperture resembles that of PUPA (*Carychium*) *corticaria*, but the superior tooth of the labium of that shell is situate much nearer to the superior termination of the labrum than the corresponding tooth of this diminutive species. It is probably a *Carychium*.

GENUS, VERTIGO MULLER AND FERRUSSAC.

P. **ovata*. Shell dextral, subovate, brown; *apex* obtuse; *whorls* five, glabrous; *suture* not very deeply impressed; *body whorl* indented near and upon the labrum; *aperture* semioval; *labium* five-

toothed, of which three are situate on the transverse portion of the lip, parallel to each other, equidistant, the superior and inferior ones being small, the latter sometimes obsolete, the intermediate one lamelliform, prominent, and the two others situate on the columella, approximate, extending at right angles to the three preceding ones, the superior one oblique and smaller; *labrum* reflected but not flattened, bidentate, teeth lamelliform, prominent; *umbilicus* distinct.

Length less than one-tenth of an inch.

Breadth nearly one-twentieth of an inch.

ANIMAL. *Tentacula* two, rather long and thick, cylindrical-obconic, retractile, with a rounded occuliferous extremity; *foot* white; *head* and *neck*, as far as the mantle, black.

Inhabits Pennsylvania.

Numerous specimens were discovered by Mr. William Hyde in the vicinity of this city, and I obtained others at Harrigate.

The smallest teeth of the labium are sometimes obsolete.

V. **pentodon*. *Shell* dextral, subovate, whitish horn-colour; *apex* obtuse; *whorls* five, glabrous, convex; *suture* not very deeply impressed; *aperture* semioval; *labium* two-toothed, of which a single very prominent one is on the middle of the transverse portion or true labium, and the other is remote, much smaller, and placed in the basal angle of the columella; *labrum* regularly arquated, tridentate, tooth nearest the base very small and placed near the

smaller tooth of the columella, the two others larger, subequal; *umbilicus* distinct.

Length less than one-tenth of an inch.

ANIMAL. *Tentacula* two, rather long and thick, cylindrical-obconic, retractile, with a rounded oculiferous extremity; two hardly elevated truncated tubercles instead of the anterior tentacula; *foot* white; *head* and *neck*, as far as the mantle, black.

Inhabits Pennsylvania.

The lower tooth of the labrum is sometimes obsolete.

MELAMPUS. MONTF.

M. **obliquus*. Obconic, reddish-brown, rather thick; *spire* very little elevated; *whorls* eight or nine, wrinkled across; *labium* with two very distinct teeth, and an intermediate and equidistant slight obtuse prominence; inferior tooth very oblique, terminating at the base; *labrum* with about eight teeth or striæ, which terminate on the margin; *base of the aperture* a little contracted by the basal tooth.

Length more than seven-twentieths of an inch.

I am indebted to Mr. Stephen Elliott for this species, who obtained it on the coast of South Carolina. It is closely allied to *Bulimus monile*, Brug. but it has no appearance of bands, which distinguish that shell. In the collection of the academy are specimens from the West Indies.

LYMNEUS. LAM.

*L. *humilis.* Shell ovate-conic, thin, translucent, with slight wrinkles; *volutions* nearly six, convex, terminal one very minute; *suture* well indented; *aperture* about equal in length to the spire; *labium* with an obvious plate of calcareous deposit; a distinct and rather open umbilical aperture; *colour* pale reddish-white or yellowish-white.

Total length seven-twentieths.

Inhabits South Carolina.

Of a dozen specimens sent me by Mr. Elliott, none exceeded the limit here assigned to the species. It differs much from any other species I have seen: a variety of it, sometimes quite black, was found by Dr. M'Euen at Oswego, on the Susquehannah.

It may be useful here to remark that, in consequence of a typographical error in the first part of the second volume of this work, the species above described may be confounded with the *desidiosus*. The length of that shell is erroneously stated to be seven-twentieths of an inch, instead of seven-tenths, its true length.

PALUDINA. LAM.

*P. *grana.* Shell conic-ovate; *whorls* not perceptibly wrinkled, convex; *suture* deeply impressed; *aperture* orbicular, hardly angulated above; *labium* with the superior edge appressed to the surface of the

penultimate volution; *umbilicus* rather small, profound.

Length less than one-tenth of an inch.

Inhabits Pennsylvania.

This very small species is found in plenty in the fish ponds at Harrowgate, crawling on the dead leaves which have fallen to the bottom of the water. It resembles *P. lustrica*, but is a smaller, less elongated shell, and the superior portion of the labium is not an unaltered continuation of the lips as in that shell, but is appressed to the surface of the penultimate whorl in the usual manner of calcareous deposition upon that part.

MELANIA.

1. *M. *catenaria*. *Shell* conic, blackish; *whorls* seven or eight, slightly undulated transversely, and with eight or nine revolving, elevated lines, the four or five superior ones of which are almost interrupted between the undulations.

Length less than half an inch.

Inhabits South Carolina.

The essential specific character resides in the catenated appearance of the superior revolving lines of the whorls, resulting from their being more prominent on the undulations which they cross, than between them, where they are often obsolete. This species was sent to me by Mr. Stephen Elliott, who obtained it in limestone springs, St. John's, Berkley.

2. *M. *multilineata*. *Shell* gradually tapering; *apex* generally much eroded; *whorls* about seven, a little convex, with numerous, filiform, elevated, subequal lines, which are from ten to twenty in number on the body whorl.

Length nineteen-twentieths; greatest width two-fifths of an inch.

Inhabits tributaries to the Delaware.

I found several specimens of this shell in Frankford creek; and professor Vanuxem presented me with others which he obtained from a creek in New Jersey. The *M. elevata* (p. 176 of this work) from its attributed specific characters, might be supposed to be nearly related to this shell, but it differs in being of a more accurate conic form, the whorls being flattened, and not convex as in this species, its raised lines are also few in number.

CYCLAS. LAM.

1. *C. *rhomboida*. *Shell* transversely orbicular-rhombiform, subequilateral, pale, with elevated somewhat regular transverse lines; *umbo* not prominent.

Breadth more than one-fourth of an inch.

Inhabits lake Champlain.

It is probable that this species attains to a somewhat larger size than the two specimens from which the above description was taken, and which were found by Mr. Augustus Jessup. It is distinguishable from *C. similis* by its more rhomboidal form.

2. *C. *partumeia*. *Shell* thin and fragile, trans-

versely-suborbicular, with small, irregular, inequidistant, concentric wrinkles, and larger adventitious undulations; *base* rounded; *anterior* and *posterior edges* regularly, equally and very obtusely curved; *beak* nearly central; *hinge teeth* prominent and distinct; *lateral teeth* prominent, white; *within* impressed by the exterior undulations, and bluish-white on the margin and submargin.

Length nine-twentieths; breadth eleven-twentieths of an inch.

This species was found by Mr. William Hyde, in a pond near Germantown, in plenty. In comparison with *C. similis*, it is thinner, more transparent, not flattened at base, more obtusely rounded each side, and instead of grooves of some degree of regularity as in that shell, it is sculptured with irregular wrinkles and waves. Mr. Hyde took fifty young ones out of a single specimen.

N. B. The genus *Cyclas* was inserted into this essay inadvertently; the species, however, are new.

The following continuation of the catalogue of books, belonging to the library of the Academy, will be found to comprise a large number received from their president, Mr. Maclure. In addition to these, and to the list already published in the last volume, the Academy have received from the same munificent patron of science, upwards of two thousand volumes on miscellaneous subjects.

CATALOGUE
OF
THE LIBRARY
OF THE
ACADEMY OF NATURAL SCIENCES.

(Continued from vol. 2. part 1.)

- 421. Accum (F.) A Practical Essay on the Analysis of Minerals, &c. Philadelphia, 1809, 12mo.
- 422. Audouin (J. V.) Recherches sur les rapports naturels qui existent entre les Trilobites et les animaux articulés, Bruxelles, 1821, 8vo.
- 423. Berger (J. F.) Essai physiologique sur la cause de l'Asphyxie par submersion.* Paris, 1805, 4to.
- 424. Bellevue (Fleuriau de) Observations géologiques, sur les côtes de la Charente Inférieure et de la Vendée, Paris, 1814, 4to.
- 425. Bruce (I.) Voyage aux sources du Nil, en Nubie, et en Abyssinie, pendant les années 1768 à 1772. Londres, 1790, 12 tomes, 8vo.
- 426. Barthelemy (L'abbé) Voyage en Italie. Paris, 1801, 8vo.
- 427. Brantz (L.) Meteorological observations made in the vicinity of Baltimore during the years 1817, 1818, 1819. Baltimore, 3 vols. 4to.
- 428. Bergman (Sir T.) Physical and Chemical essays, London, vol. 2d, 1784, 8vo.
- 429. Blasius (G.) Observata anatomico-practica in Homine brutisque variis, Lugdini Batavorum, 1674, 12mo.

430. Brongniart (Adolphe) Sur la classification et la distribution des végétaux fossiles, Paris, 1822, 4to.
431. ——— (Alexandre) Description géologique des environs de Paris, par G. Cuvier et A. Brongniart, nouvelle édition, Paris, 1822, 4to.
432. ——— Notice sur des végétaux fossiles traversant les couches du terrain houiller, Paris, 1821, 4to.
433. ——— Sur les caractères zoologiques des formations &c. Paris, 1822, 4to.
434. ——— Notice sur la Magnésite du bassin de Paris, Paris, 1822, 8vo.
435. Carter (C.) Dissertatio de Diabete mellito, Paris, 1811, 4to.
436. Cloquet (I.) Mémoire sur la membrane pupillaire et sur la formation du petit cercle artériel de l'Iris, Paris, 1818, 4to.
437. Clarke (E. D.) Voyages en Russie, en Tartarie, et en Turquie, Paris, 1813, 3 tomes, 8vo.
438. Craven (Lady) Voyage à Constantinople par la Crimée en 1786, Paris, 1789, 8vo.
439. Colla (L.) Memoria sul genere Musa e monografia del medesimo, Turin, fol.
440. Capelli (C.) Catalogus Stirpium quæ aluntur in regio horto botanico Taurinensi, Augstæ Taurinorum, 1821, 8vo.
441. Cuvier (G.) Compte rendu des travaux de la classe des sciences mathématiques et physiques de l'Institut Royal. Partie physique, Paris, 4to.
442. Cathrall (I.) Memoir on the Analysis of the Black Vomit, ejected in the last stage of the Yellow Fever, Philadelphia, 1800, 8vo.
443. Carena (H.) Monographie du genre Hirudo, Turin, 4to.
444. Depons (F.) Voyage à la partie orientale de la Terre Ferme dans l'Amérique méridionale fait pendant les années, 1801 à 1804, Paris 1807, 3 tomes, 8vo.
445. De la Roche (E. E.) Experiences sur les effets qu'une

- forte chaleur produit dans l'économie animale, Paris, 1806, 4to.
446. Dudanjon (C. I.) Dissertation sur un nouveau mode de pansement, &c. des plaies d'armes à feu. Paris, 1803, 4to.
447. Drake (D.) An Inaugural Discourse on Medical Education, Cincinnati (Ohio) 1820, 12mo.
448. De la Sablonniere (B.) Dissertation sur l'Asphalte ou ciment naturel, &c. Paris, 1721, 12mo.
449. De Saussure (H. B.) Voyages dans les Alpes, &c. tomes 5 à 8, Neufchatel, 1796, 4 tomes, 8vo.
450. Dambourney (M. L. A.) Recueil de procédés et d'expériences sur les teintures solides, &c. Paris, 1786, 8vo.
451. Doussin-Dubreuil (I. L.) De la nature et des causes de la Gonorrhée bénigne et des Fleurs blanches, Paris, 1804, 8vo.
452. Draparnaud (J. P. R.) Histoire Naturelle des molusques terrestres et fluviatiles de la France, Paris, 1806, 4to.
453. Evans (O.) Manuel de l'ingenieur mécanicien, constructeur de machines à vapeur, traduit de l'Anglais par I. Doolittle, Paris, 1821, 8vo.
454. Fowler (T.) Medical Reports of the Effects of Arsenic in the cure of Agues, Remitting Fevers and Periodic Headaches, London, 1786, 8vo.
455. Flourens () Analyse de la Philosophie Anatomique, Paris, 1819, 8vo.
456. French (I.) The Art of Distillation, &c. London, 1667, 4to.
457. Férussac (Baron de) Tableau systématique des animaux Molusques Classés en familles naturelles, Paris et Londres, 4to.
458. Gummere (I.) An Elementary Treatise on Astronomy, Philadelphia, 1822, 8vo.
459. Gravelot et Cochin, Iconologie par figures, ou traité complet des Allégories, Emblèmes, &c. Paris, 4 tomes, 8vo.

460. Galpine (I.) A Synoptical Compend of British Botany. Salisbury, 1806, 12mo.
461. Ives (A. W.) An Experimental Enquiry into the proximate cause of death from suspended respiration, in drowning, New York, 1814, 8vo.
462. Keating (W. H.) Considerations upon the art of mining, &c. Philadelphia, 1821, 8vo.
463. Keill (I.) An Introduction to Natural Philosophy or Philosophical Lectures, London, 1726, 8vo.
464. Kircher (A.) La Chine illustrée, &c. Amsterdam, 1670, folio.
465. Legouais (A. P. F.) Réflexions et Observations sur l'emploi des saignées et des purgatifs dans le traitement de la Peritonite puerperale, Paris, 1820, 4to.
466. Le Vaillant (F.) Histoire Naturelle des Perroquets, Paris, 1804, 2 tomes, folio.
467. Linné (C.) Systema Naturæ, &c. Lipsiæ, 1788, cura I. T. Gmelin, 2 vols. 8vo.
468. Le Roy () Précis des recherches faites en France depuis l'année 1730, pour la détermination des longitudes en mer, par la mesure artificielle du tems, Amsterdam, 1773, 4to.
469. Lawrence (W.) An Introduction to Comparative Anatomy and Physiology, London, 1816, 8vo.
470. ——— Lectures on Physiology and Zoology, and the Natural History of Man, London, 1819, 8vo.
471. Lippi (C.) Fu il fuoco o l'acqua che sotterno Pompei ed Ercolano, &c. Napoli, 1816, 8vo.
472. ——— Principi pratici de Mekanica applicata all'utilita pubblica, Napoli, 1811, 8vo.
473. ——— Promotion des sciences utiles et de l'industrie, Paris, 1806, 12mo.
474. ——— Corso di Scienze, Napoli, 1816, 8vo.
475. Lesteyrie, (C. P.) Del Guado e di altri vegetabili da cui si puo estrarre un color turchino, &c. Roma, 1811, 8vo.
476. Lavoisien (I. F.) Dictionnaire portatif de Médecine, &c. Paris, 1771, 12mo.

477. Locke (I.) *An Essay concerning Human Understanding*, Boston, 1803, 3 vols. 8vo.
478. McNeven (W. I.) *Chemical Examination of the Mineral Water of Schooley's Mountain*, New York, 1815, 4to.
479. ——— *Exposition of the Atomic Theory of Chemistry, &c.* New York, 1819, 8vo.
480. Meade (W.) *An Experimental Enquiry into the Chemical and Medicinal qualities of the Principal Waters of Ballstown and Saratoga, &c.* Philadelphia, 1817, 8vo.
481. Marechal (S.) *Costumes civils actuels de tous les peuples connus, dessinés d'après nature, gravés et coloriés, &c.* Paris, 1788, 4 tomes, 4to.
482. Michaux (A. F.) *The North American Sylva, or a Description of the Forest Trees of the United States, Nova Scotia, &c. translated from the French*, Paris, 1819, 7 vols. 8vo.
483. Olafsen and Povelson. *Voyage en Islande, &c. traduit du Danois par G. de Lapeyronie*, Paris, 1802, 5 tomes, 8vo.
484. Priestley (I.) *Experiments and observations on different kinds of air, &c.* Birmingham, 1790, 3 vols. 8vo.
485. Parkinson (I.) *Outlines of Oryctology. An introduction to the study of fossil organic remains, &c.* London, 1822, 8vo.
486. Patrin (E. M. L.) *Recherches sur les volcans, d'après les principes de la chimie pneumatique*, 1800, 4to.
487. Pontedera (I.) *Anthologia, sive de floribus naturae libri tres, &c.* Pativii, 1720, 4to.
488. Pernetty () *Histoire d'un voyage aux Isles Malouines fait en 1763—4, &c.* Paris, 1770, 3 tomes, 8vo.
489. Parkes (S.) *Descriptive account of the several processes which are usually pursued in the manufacture of the article known in commerce by the name of Tin plate.* London, 1818, 8vo.
490. Picard () *Historische Beschryving ser Reisen of ni-lurve en volkome verzameling zee en landtogten*

- (translated into Dutch by J Vanderschey 21st and last volume) Amsterdam, 1767, 4to.
491. Rucco (I.) A Dissertation on the General Principles of Anatomy and Comparative Physiology, &c. Philadelphia, 1811, 8vo.
492. Reichard (H.) Itineraire de poche de l'Allemagne et de la Suisse avec les routes de Paris et de Petersbourg, Frankfort sur Maine, 1809, 12mo.
493. ——— Der passagier auf der Reise in Deutschland, &c. Weimar, 1801, 8vo.
494. Risso (I. A.) Essai sur l'Histoire Naturelle des Orangers Bigaradiers, Limettiers, &c. Paris, 1813, 4to.
495. ——— Histoire Naturelle des Crustacées des environs de Nice, Paris, 1816, 8vo.
496. ——— Ichthyologie de Nice, Paris, 1810, 8vo.
497. Reeve (H.) An Essay on the Torpidity of Animals, London, 1809, 8vo.
498. Rafinesque (C. S.) Prodrome d'une monographie des Rosiers de l'Amerique septentrionale, &c. Sur le Genre Houstonia, &c. Prodrome d'une monographie de Tubinolies, &c. Bruxelles, 1820, 8vo.
499. ——— Sur les genres Tridynia, Lysimachia, &c. Bruxelles, 1820, 8vo.
500. ——— Monographie des coquilles bivales et fluviatiles de la riviere Ohio, &c. Bruxelles, 1820, 8vo.
501. ——— Sur les animaux Polistomes et Porostomes Bruxelles, 1820, 8vo.
502. ——— Sur quelques animaux hybrides. Nomenclature synandrique ou description des differens modes d'union parmi les étamines, Bruxelles, 1820, 8vo.
503. Roland () Mémoire au Roi Louis XVI. &c. Londres, 1784, 8vo.
504. Schweinitz (L. D. de) Specimen Floræ Americæ septentrionalis Cryptogamicæ, &c. Raleigh, N. C. 1821, 8vo.
505. ——— Synopsis Fungorum Carolinæ Su-

perioris, &c. e commentariis Societatis Naturæ Curiosorum Lipsiensis excerptæ, 4to.

506. Sternberg (Gaspard Comte de) Essai d'un exposé géognostico-Botanique de la flore du Monde primitif, Leipsic et Prague, 1820, folio.
507. Spafford (H. G.) Some cursory observations on the ordinary construction of wheel carriages. Albany, 1815, 8vo.
508. Sementini (L.) Memoria sui metalli della Potasa e della Soda e sul gas idrogeno potassiato, Napoli, 1810, 8vo.
509. Smith (A.) An Enquiry into the Nature and Causes of the Wealth of Nations, Basil, 1701, 4 vols. 8vo.
510. Tavernier (J. B.) Les six voyages en Turquie, en Perse et aux Indes, &c. Paris, 1776, 4 tomes, 4to.
511. Tenore (M.) Catalogus Plantarum horti regii Neapolitani, Neapoli, 1813, 4to.
512. Taylor (T.) An Account of a New Mineral Substance discovered at Killeney in the vicinity of Dublin, 4to.
513. Van Hoorbecke (C. J.) Mémoire sur les Orobanches, &c. Gand, 1818, 8vo.
514. Volney (C. T.) Tableau du climat et du sol des Etats Unis d'Amerique, &c. Paris, 1803, 4 tomes, 8vo.
515. Von Moll (C. E. F.) Annalen der Berg und Hüttenkunde, Salzburg, 1802, 12mo.
516. Webster (J. W.) A Description of the Island of St. Michael, &c. Boston, 1821, 8vo.
517. White (I.) Voyage à la nouvelle Galles du sud, à Botany Bay, au Port Jackson en 1787—88—89, Paris 1795, 8vo.
518. The Philosophical Magazine and Journal, from No. 175 to 272, inclusive, edited by A. Tilloch, London, 8vo.
519. Introduction aux observations sur la Physique, sur l'Histoire Naturelle et sur les Arts, Paris, 1777, 2 tomes, 4to.
520. Observations sur la Physique, sur l'Histoire Naturelle et sur les Arts, Paris, 1784 à 1821, 92 tomes 4to. (vol. 80, and June No. vol. 82, October vol. 83, August vol. 85, deficient.)

521. *Annales du Muséum National d'Histoire Naturelle*, Paris, 1802-1821, 20 tomes, 4to.
522. *Revue Encyclopédique*, ou analyse raisonnée des productions les plus remarquables dans la littérature, les sciences et les arts, Paris, 1809—1822, 13 tomes, 8vo. (Nos. 27, 30, 31 deficient.)
523. *American Journal of Sciences and Arts*, by Benjamin Silliman, vol. 5, 1822, 8vo.
524. *Journal of the Royal Institution of Great Britain*, vol. 1. London, 1802, 8vo.
525. *Transactions of the American Philosophical Society held at Philadelphia for promoting useful knowledge*, Philadelphia, 1789-1809, 6 vols. 4to.
526. *The Journal of Science and the Arts*, edited at the Royal Institution of Great Britain, New York, 1817-1819, 5 vols. 8vo.
527. *Transactions of the Geological Society*, vol. 1. 1811, 4to.
528. *Journal de Physiologie expérimentale*, par F. Majendie, Nos. 2, 3 et 4, Tom. 1, Paris, 1821, 8vo.
529. *Rapport sur la situation de l'école Polytechnique*, &c. Paris, 1803, 4to.
530. *The Western Quarterly Reporter of Medical, Surgical and Natural Science*, &c. edited by J. D. Godman, M. D. Cincinnati, 1812, 3 Nos. 8vo.
531. *Journal complémentaire du Dictionnaire des Sciences Médicales*, C. L. F. Pankoucke editeur, Paris, 1811, 1er. No. 8vo.
532. *Compte rendu et présenté au corps législatif par l'Institut National des sciences et arts*, années iv. v. vi. vii. Paris, 4 tomes, 8vo.
533. *Descrizione dell Imp. e Reale Museo di Fisica e storia naturale di Firenze*, Firenze, 1819, 8vo.
534. *Fifth Annual Report of the Committee of the Society for the Promotion of Permanent and Universal Peace*, for 1821, London, 8vo.
535. *Epitome entomologiæ Fabricianæ, sive nomenclator entomologicus emendatus*, &c. Lipsiæ, 1787, 8vo.

536. Habillemens de plusieurs nations, représentés au naturel, Leide, 4to.
537. Book of Post Roads in Germany, &c. 4to.
538. Address and Regulations of the Astronomical Society of London, London, 1821, 8vo.
539. Rapport fait à l'Athénée des arts par Messieurs le Blond, de Trouville, de Saintot et J. Dubuisson sur l'ouvrage de M. Dubois Foucou, ayant pour titre. "Exposé de nouveaux procédés pour la confection des dents dites de composition," Paris, 1809, 8vo.
540. Instruction sur l'établissement des nitrières et sur la fabrication du Salpêtre, Paris, 1803, 8vo.
541. Memorie della Reale Accademia della Scienze di Torino, Tomi 24, 25, Torino 1820, 2 Tomi, 4to.
542. Bulletin de la Société d'Encouragement pour l'industrie nationale, Paris, 1821, 4to.

LIST OF DONORS
 TO THE
LIBRARY
 OF THE
ACADEMY OF NATURAL SCIENCES
 OF
PHILADELPHIA,

With reference to the numbers affixed in the foregoing catalogue to the books presented by them respectively.

Royal Academy of Sciences of Turin, 541.

William Maclure, 423, 424, 425, 426, 435, 437, 438, 440, 441, 444, 445, 446, 448, 449, 450, 451, 455, 459, 466, 467, 468, 475, 476, 481, 483, 486, 487, 492, 493, 503, 509, 510, 514, 517, 519, 520, 521, 522, 525, 528, 529, 531, 532, 536, 537, 539, 540, 542.

Z. Collins, 452, 511. 535.

Alexander Brongniart, Paris, 431, 432, 433, 434,

Adolph Brongniart, do. 430.

Samuel Parkes, London, 489, 534, 538.

Baron de Férussac, Paris, 457.

Comte de Sternberg, 506.

W. Lawrence, London, 469, 470.

L. D. de Schweinitz, Bethlehem, 504, 505.

Mrs. B. S. Barton, 478, 507.

C. J. Van Hoorebeke, 513.

- J. A. Risso, Nice, 494, 495.
L. Colla, Turin, 429.
Professor H. Carena, do. 443,
J. Cloquet, M. D. Paris, 436.
C. Lippi, Naples, 471, 472, 473, 474.
J. Rucco, M. D. 491.
J. D. Godman, M. D. 530.
Mrs. Cathrall, 442.
L. Brantz, Baltimore, 427.
J. V. Audouin, Paris, 422.
Benjamin Silliman, New Haven, 523.
W. J. McNevin, New York, 479.
J. Doolittle, Paris, 453.
J. W. Webster, Boston, 516.
D. Drake, M. D. Cincinnati, 447.
A. P. T. Legouais, 465.
W. H. Keating, 462.
W. Meade, M. D. 527.
J. Gummere, 458.
R. Haines, 461.
C. F. Rafinesque, 498, 499, 500, 501, 502.
R. E. Griffith, M. D. 429, 460, 464, 496, 533.
J. Lea, 421, 497, 512.
J. Pearce, 484.
C. C. Biddle, 526.

LIST OF DONATIONS
TO THE
MUSEUM
OF THE
ACADEMY OF NATURAL SCIENCES,

From December 1818 to January 1823.

1819.

Articles presented.	Donors.	When presented.
Scorpion, &c.	Mr. Shoemaker.	January.
Sulphate of Lime, from near Paris.	I. Lukens.	
Shells, three species.	Professor Cooper.	
Sulphate of Lead, Perkiomen.	J. P. Wetherill.	February.
Fossil Shells, Mullica Hill, N. J.	A Jessup.	
Fossils, Ohio.	T. Blight.	
Strombus, one species.	J. Pearce.	
Shells, five species.	I. Lea.	March.
Fragments seed genus Cucurbitina, from Alluvial Depo- site, N. J.	G. Haines, N. J.	
Nautilus Pompilius, &c.	E. Tilghman.	
Fossils, N. J.	J. P. Wetherill.	
Shells.	J. Bowen.	
Collection of Seeds.	J. Palmer, Calcutta.	
Shells, forty-three species, &c.	Dr. Gregory,	April.
Head of the 'Barbarossa, Rep- tilia, &c. &c.	Captain Hewett.	

LIST OF DONATIONS.

395

Articles presented.	Donors.	When presented.
Herbarium, British Plants, 8 vols. }	Dr. E. Barton.	
Head of a Porpoise.	Captain ———.	
Clay from Java.	Captain Voorhees.	
Minerals, &c.	Capt. Hewitt.	
Seeds, eighty species.	J. Palmer, Calcutta.	
Minerals and Fossils, Huntsville, Alabama. }	N. Ware.	May.
Fossils, do.	S. Hazard.	
Serpent from Java.	J. Warder.	
Graphic Granite, Germantown.	J. Bowen.	June.
Shells, Minerals, &c.	A. Stewart.	July.
Minerals.	J. Sowerby, London.	
Laumonite.	Dr. Hays.	
Four Boxes of Insects, East Indies. }	Captain Warnick.	
Calculus from stomach of a horse.	R. Thomas.	
Minerals from Monte Video.	Dr. Baldwin.	August.
Collection of Fossils from New York and Pennsylvania. }	Dr. Hays.	September.
Stomach of a Wild Duck, containing a snake. }	S. P. Wetherill.	
Minerals, London Grove.	W. Jackson.	
Beryl.	J. Ferris.	
Fossils from Hudson River.	Dr. S. Brown.	
Specimens Fish and Crustacea.	Captain T. Hamilton.	
Native Sulphur, Geneva, New York. }	J. H. Dulles.	
Brismuth, Huntingdon, Connecticut. }		
Fossil, Falls of Niagara.	Dr. Coates.	

1820.

Minerals, Kentucky.	A. Jessup.	January.
Iridescent Schuylkill Coal.	C. Carmalt	
Jasper, Delaware County.	Z. Collins.	

Articles presented.	Donors.	When presented.
A Living Buck (<i>Cervus Virgini- anus</i> .)	C. Cist, Wilkesbarre.	Feb'y.
Minerals.	T. M'Euen.	April.
Dress, &c. South Sea Islanders.	J. Shane.	
Salmo Epulans, Rariton.	Dr. Mease.	
Exocetus, Sepia.	R. Randolph.	May.
Living Field Mouse, (<i>Arvicola</i> .)	Mr. Bishop.	
Minerals, three specimens, China.	J. Read.	June.
Shells, Gorgonia, &c. St. Helens, South Carolina.	N. Hentz.	
Minerals, Shawneetown, Illinois.	A. Jessup.	
Twelve Chinese drawings of Fish.	J. P. Wetherill.	
Fossils, two species.	Z. Collins.	
Bitumen, St. Thomas.	D. S. Mitchell.	September.
Fossils, &c.	Dr. S. Brown.	
Iron Ore, N. J.	I. Lukens.	
An extensive and valuable Her- barium of Plants from the vi- cinity of Paris.	W. Maclure.	
Coal Slate, Neshamoning.	H. Abbott.	
Carbonate of Lead, &c. Perkiomen.	J. P. Wetherill.	November.
Minerals, sixty-five specimens, il- lustrating the Geology of the Environs of Paris.	L. Vanuxem and W. H. Keating.	
Minerals, from near Ticonderoga.	T. M'Euen, &c.	
Minerals from Sweden.	William Maclure.	Decem'r.
Minerals, six specimens.	Dr. Emerson.	
Diallage, Virginia.	Z. Collins.	
Herbarium, of Delaware and Ma- ryland plants.	J. S. Warner.	
Radiated Sulphate of Lime.	I. Lea.	

1821.

Minerals, seven specimens.	C. A. Lesueur.	January.
Minerals, four do.	T. M'Euen.	

Articles presented.	Donors.	When presented.
Model in wood, showing the decrements on the cube.	I. Lukens.	
Oxide of Iron, Perkiomen.	J. P. Wetherill.	
Productus, Kentucky.	Major Long.	
Native Mercury, Saxony.	Dr. Mease.	
Twelve Chinese Paintings of Fish.	J. P. Wetherill.	
Shells from New Holland, &c.	C. A. Lesueur.	
Antiquities from the Ruins of Aquilla, &c.	T. Bedwell.	
Minerals, two specimens.	Dr. Hays.	
Shells from Guadaloupe.	C. A. Lesueur.	February.
Hydatigena from liver of the common mouse.	Dr. Harlan.	
Fossils, &c.	S. P. Wetherill.	
Sulphate of Lime, Niagara.	Dr. Hays.	
Shells, two species.	C. A. Lesueur.	
Fossils, four specimens, &c. Richmond coal mines.	T. Nuttall.	
Platirostra edentula, Ohio river.	J. Speakman.	
Specimens of the Larva and Crysalis of the Gastrophilus equi, with the perfect animal	Dr. Harlan.	
Breccia from the Potomac.	Wm. Strickland.	March.
Egg of the Common Fowl, exhibiting a singular case of malformation.	Dr. Harlan.	
Minerals.	A. E. Jessup, J. Lukens and B. Say.	
Lavas from Vesuvius.	Dr. Mease.	
Twelve Medals.	M. Dorfeuille.	
Crysoberyl, Haddam Connecticut.	T. M'Euen.	
Specular Iron Ore, Elba.	Dr. Reese.	April.
Trilobite in clay slate, from Angers on the Loire.	Dr. Troost.	
Cancer, two species.	Dr. Harlan.	
Teredo, St. Thomas.	C. A. Lesueur.	
Minerals, seven specimens, Chester County, Pa.	W. Jackson.	

Articles presented.	Donors.	When presented.
Shells from the German Ocean.	W. S. Warder.	May.
Fossils, Mullica Hill, N. J.	A. E. Jessup.	
Fœtus of a Squalus.	J. P. Wetherill.	
Mysis (new species) Gulf Stream.	R. Milnor. M. D.	
Shells, Bonavista.	Dr. Harlan.	
Shells from East Indies.	} A. E. Jessup.	
Fresh Water and Land Shells, Brandywine.		
Crystallized Chlorite, half a mile below Flat Rock, Schuylkill.	} T. Nuttall.	
Spongia, four specimens, West Indies.		
Minerals, &c.	J. Bowen.	June.
Box of Seeds.	Dr. Wallich, Calcutta.	
Ten Bottles Serpents, Insects, &c.	W. Jones,	do.
Wild Cat (<i>Felis rufa</i>) killed six miles from Philadelphia.	} J. Gilliams.	
Minerals.		
Sulphate of Lead, Perkiomen.	J. P. Wetherill.	
Lapis Lazuli, China.	J. Read, jr.	July.
Crystallized Sulphate of Lime, Onondago County, New York.	} Dr. Hays.	
Carbonate of Lime, Perkiomen Creek.		
Feldspar, Dixon's Quarry, near Wilmington	} B. Say.	
Fossils, mouth of Columbia Ri- ver.		
	} S. B. Collins, New York.	
Striatulumus.		
Shells from the East Indies.	J. Bakewell, Pittsburg.	
Living Aligator, South Carolina.	Midship. H. Etting, U. S. N.	
Shells, Minerals, &c.	Dr. S. H. Dickson, Charleston.	
Shells from California, &c.	G. Ord	
Tænia and ascaris from the Cat.	} Dr. Harlan.	
Tænia, three specimens from the Dog.		
Hydatids from the Goat, two specimens.		

Articles presented.	Donors.	When presented.
Fibrous Sulphate of Lime, Pittsburg.	T. Lea.	
Pupa Cinerea, Europe.	J. Ord.	
Various Reptilia, Fish, &c. Manilla.	Dr. Barnwell, United States Navy.	September.
Hornblende, Chesnut Hill.	G. Spackman.	
Belemites, Burlington County, New Jersey.	S. W. Conrad.	
Condrodite and Graphite in Carbonated Lime, Sparta, New Jersey.	B. Say and J. P. Wetherill.	
Cymothoa from the Black Fish.	R. Haines.	October.
Silver Ore from Potosi.	N. Biddle.	
Shells, coast of United States.	C. A. Lesueur.	
Lepas Vitrea, Long Branch, New Jersey.	Dr. McEuen.	
Conferva Gelatinosa, Maurice River.	Z. Collins.	
Bombyx Atlas, China.	Dr. Harlan.	
Glauberite two specimens, villa Rubia, Spain.	William Maclure.	
Petrified Wood of the Tamarind Tree, Madras.	G. Benners.	
Cornu Ammonis, &c. Virginia.	S. Speakman.	November.
Iron Ore, Schooley's Mountain.	Dr. Barnwell.	
Animal (supposed) Proteus.	J. Speakman.	
Micaceous Iron Ore, Corlaer's Hook, New York.	E. Cozins.	
Minerals, two specimens.	Z. Collins.	
Hornblende (with supposed Laumonite) from Wilmington.	G. Spackman.	December.

1822.

Two bottles, containing marine animals from South America.	G. Bedwell.	January.
Phosphate of Lime from London Grove, Chester county.	W. Jackson.	

Articles presented.	Donors.	When presented.
Two Flying Squirrels from near Philadelphia.	J. Gilliams.	February.
Red oxide of Iron and Carbonate of Lime, Stroudsburg, Pennsylvania.	Mr. Stroud per R. Haines.	March.
Phosphate of Lime, Chester County.	Z. Collins.	
Arsenate of Lime from Thuringen.	W. Maclure.	
Supposed Impressions of Organic Remains in anthracite from Beaver meadows.	Dr. Coates.	
Green Steatite from Waggon-town, forty miles west of Philadelphia.	Dr. Patterson.	
Petrifaction, Java, fifteen miles from the sea coast.	Dr. Harlan.	
Two seed vessels of a Dolichos and a specimen of Upas toxica.	W. Dick.	
Strongylus Armatus and Ascaris Lumbricoides from the intestines of a horse.	Dr. Harlan.	April.
Shells of the United States.	I. Lea.	
Spinelle Pleonaste and Leucite from Vesuvius.	Dr. Griffith.	
Cranium and Horns of a Cervus Virginianus, and a Common Lynx.	W. S. Warder.	
Crystallized Feldspar, Providence township.	T. Nuttall.	
Minerals, three specimens from Florida.	Major Ware.	
Cranium and Horns of a Cervus Axis, from India, and Pterocera Lambis.	Dr. Harlan.	
Fossils, three specimens.	Z. Collins.	
Two specimens Crystallized Quartz in the gangue from Compostella, Spain.	W. Maclure.	
Terebratulite, Centre County, Pa.	Dr. Hays.	

LIST OF DONATIONS.

401

Articles presented.	Donors.	When presented.
Minerals, seventeen specimens from Gape de Gat, Spain.	W. Maclure.	May.
Pecten Maximus.	G. Ord.	
Crystal of Beryl, Chester county.	J. Peirce.	
Crystal of Quartz, Lancaster county.	J. Gilliams.	
Sulphate of Magnesia from Spain.	W. Maclure.	
Cardium.	Captain Bache, U. S. E.	
Nodular Iron Ore, &c. from near Washington.	Dr. Bache.	
Minerals, three specimens, Iron Hills, Delaware.	G. Spackman.	
Collection of Insects from Bra- zil.	G. Bedwell.	
Tremolite, London Grove.	J. Pierce.	
Specimens of Fish, Snakes, &c.	Dr. Hodge.	
Fresh Water Shells from Lake Michigan.	A. Schoolcraft.	June.
Asbestos, from near West Ches- ter.	J. Darlington.	
Minerals, two specimens.	A. E. Jessup.	
Jeffersonite (new mineral.)	W. H. Keating.	
Oliva, two specimens.	Dr. Hays.	
Phos, one species.	Dr. Coates.	
Fragments of animal remains supposed to be parts of teeth, used as ornaments, Ancocus Creek, New Jersey.	J. Gilliams.	
Onychia Angulata.	Dr. Hodge.	
Petrified Wood, Fayetteville, North Carolina.	Dr. M'Euen.	
Italian Marbles, one hundred and twenty specimens.	J. Dulles.	
Colophonite, &c. Lake Champlain.	A. E. Jessup	
Turbineella, two species.	Dr. Harlan.	July.
Bottle containing Marine Ani- mals. &c. from Columbia, South Carolina.	Professor Vanuxem.	

Articles presented.	Donors.	When presented.
Shells and Marine Animals, from the East Indies.	Dr. J. K. Mitchell.	
Nankin Lark.	Dr. Hays.	
Volume of British Fuci and Fernes.	Dr. Griffith in name of Dr. E. Barton.	
Three shells, East Indies.	Dr. Harlan.	
Sertularia, two specimens, from Cape May.	A. E. Jessup.	
Coluber Porcatus.	Professor Vanuxem.	
Organic Remains, six specimens from New York.	A. E. Jessup.	
Phylolithos, from Wilkesbarre.	Wm. Dick, jr.	August.
Exogyra from Mullica hill, New Jersey.	Dr. G. Haines.	
Bituminous Coal from Pittsburg.	G. Bedwell.	
Tourmaline, Chester county.	J. Lukens.	
Copper Ore from near Lebanon, Pennsylvania.	W. S. Warder.	
Fossil Fistularia, from New Jer- sey.	A. E. Jessup.	September
Tubipora Musica from the Southern ocean.	J. Kirk.	
Salimandra Longicauda	Professor Green.	
Arca from East Indies.	Dr. Harlan.	
Vaginalis Chionis of Cape Horn.	Dr. Harris.	October.
Madagascar Bat.	Captain Phillips.	
Organic Remains from the Al- legany mountains.	I. Lea.	
Candle made from the wax of Myrica Cerifera.	W. H. Keating.	
Shells, seven specimens from England.	W. Hyde.	
Amphibole, two specimens from Delaware.	G. Spackman.	
Coal, two specimens.	J. Speakman.	
Lythodomus, one species bal- last from West Indies.	C. A. Lesueur.	

Articles presented.	Donors.	When presented.
Turbo Oleagina and two ink-stands of Steatite from China. }	Dr. J. K. Mitchill.	Nov'r.
Perna from West Indies.	C. A. Lesueur.	
Madrepora meandrina and several specimens Stalactites, &c. from the Bermudas. }	J. Bowen.	
Catostomus, two species, from the Ohio. }	C. A. Lesueur.	
Shells, two species, New England.	Z. Collins.	
One hundred Botanical specimens from Switzerland. }	E. Tyson.	
Meandrina from Havannah, and Cast of a large Strombus from the Matanzas. }	W. H. Keating.	December.
Twelve specimens of Birds from Italy. }	Professor Bonelli of Turin.	
Box of Insects.	Mr. Bonfils of Bordeaux.	
Fruits of an Urchas and Mimosas from the Mexican gulf. }	Lt. Gaunt, United States Navy.	

INDEX

TO THE

SECOND VOLUME.

A.		<i>Bulimus multilatus</i> ,	373
<i>Amphibole</i> , Analysis of,	139	<i>Bulla</i> ? <i>fluviatilis</i> ,	178
<i>Amphidesma æqualis</i> ,	307	<i>solitaria</i> ,	245
<i>orbiculata</i> ,	307	<i>Buthus vittatus</i> ,	61
<i>punctata</i> ,	308	C.	
<i>Anaphia pallida</i> ,	60	<i>Cadmia</i> of Ancram,	289
<i>Anatina papyratia</i> ,	314	<i>Callirhoe digitata</i> ,	181
<i>Arca incongrua</i> ,	268	<i>Carpobolus orbicularis</i> ,	368
<i>pexata</i> ,	268	<i>Centaurea Americana</i> ,	117
<i>ponderosa</i> ,	267	<i>Cerithium dislocatum</i> ,	235
<i>transversa</i> ,	269	<i>Cermatia coleoptrata</i> ,	109
<i>Asparagus stone</i> , analysis		<i>Chelifer muricatus</i> ,	63
of,	144	<i>oblongus</i> ,	64
<i>Aster graveolens</i> ,	116	<i>Cichla ænea</i> ,	214
<i>Astragalus micranthus</i> ,	122	<i>fasciata</i> ,	216
<i>Augite</i> and varieties,	189	<i>Floridana</i> ,	219
in granite,	146	<i>minima</i> ,	220
<i>Automalite</i> ,	249	<i>Ohioensis</i> ,	218
<i>Avicula hirundo</i> var,	262	<i>Coccolite</i> ,	190
B.		<i>Columbella avara</i> ,	280
<i>Bdella oblonga</i> ,	74	<i>Conopea elongata</i> ,	324
<i>Belona argalus</i> ,	125	<i>Copper Ore</i> , Analyses of,	142
<i>carribœa</i> ,	127	<i>Corbula contracta</i>	312
<i>crocodila</i> ,	129	<i>Coreopsis tinctoria</i> ,	114
<i>indica</i> ,	130	<i>Coronula dentulata</i> ,	325
<i>truncata</i> ,	126	<i>Crepidula convexa</i> ,	227
<i>Buccinum ornatum</i> ,	229	<i>depressa</i> ,	225
		<i>fornicata</i> ? var.	225

<i>Ixodes scapularis</i> ,	78	<i>Melania canaliculata</i> ,	175
<i>variabilis</i> ,	77	<i>catenaria</i> ,	379
<i>Jeffersonite</i> , described and		<i>conica</i> ,	176
analysed,	194	<i>elevata</i> ,	176
<i>Julus annulatus</i> ,	103	<i>multilincata</i> ,	380
<i>impressus</i> ,	102	<i>prærosa</i> ,	177
<i>Julus lactarius</i> ,	104	<i>Melampus bidentatus</i> ,	245
<i>marginatus</i> ,	105	<i>obliquus</i> ,	377
<i>punctatus</i> ,	102	<i>Modiola Americana</i> , var.	265
<i>pusillus</i> ,	105	<i>castaneæ</i> ,	266
		<i>Mollinesia latipinna</i> ,	3
L.		<i>Mya acuta</i> ,	313
		<i>mercenaria</i>	313
<i>Leachia cyclura</i> ,	90	<i>Mytillus cubitus</i> ,	263
<i>Lebia ellipsoidea</i> ,	6	<i>hamatus</i> ,	265
<i>Leptus araneii</i> ,	80	<i>lateralis</i> ,	264
<i>hispidus</i> ,	81		
<i>Lime</i> , green phosphate of,		N.	
Analysis,	144		
phosphate of,	56	<i>Nassa acuta</i> ,	234
<i>Limnochares extendens</i> ,	80	<i>obsoleta</i> ,	232
<i>Lithobius spinipes</i> ,	108	<i>trivittata</i> ,	231
<i>Loligo Barthingii</i> ,	95	<i>vibex</i> ,	231
<i>Bartramii</i> ,	90	<i>Natica duplicata</i> ,	247
<i>illecebrosa</i> ,	95	<i>heros</i> ,	248
<i>Pavo</i> ,	26	<i>pusilla</i> ,	258
<i>Pealeii</i> ,	92	<i>Nemophila phacelioides</i>	179
<i>Lutraria</i> , canaliculata,	311	<i>Nucula proxima</i> ,	270
<i>lineata</i> ,	310		
<i>Lymneus appressus</i> ,	168		
<i>desidiosus</i> ,	169	O.	
<i>elodes</i> ,	169		
<i>elongatus</i> ,	167	<i>Ocypete comata</i> ,	82
<i>emarginatus</i> ,	170	<i>Cenothera linifolia</i> ,	120
<i>humilis</i> ,	378	<i>serrulata</i> ,	120
<i>macrostomus</i> ,	170	<i>speciosa</i> ,	119
<i>reflexus</i> ,	167	<i>triloba</i> ,	118
		<i>Cestrus hominis</i> ,	353
M.		<i>Officers for the year 1822</i> ,	
		list of,	193
<i>Machilis variabilis</i> ,	12	<i>Oliva mutica</i> ,	228
<i>Mactra lateralis</i> ,	309	<i>Onykia angulata</i> ,	298
<i>oblonga</i> ,	310	<i>carribæa</i> ,	98
<i>similis</i> ,	309	<i>Oribita concentrica</i> ,	73
<i>Melania armigera</i> ,	178	<i>glabrata</i> ,	73
		<i>Ostrea semicylindrica</i> ,	258

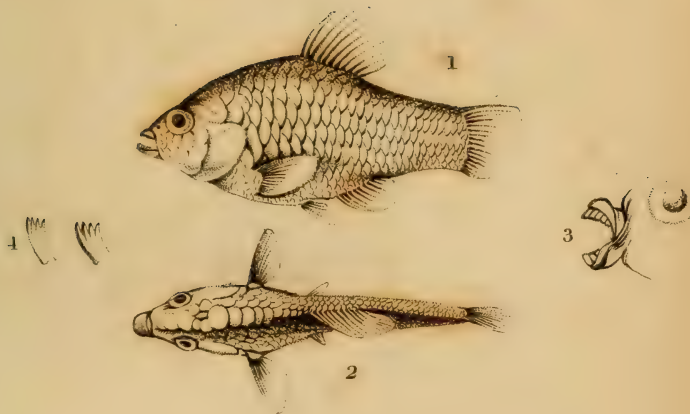
P.		R.	
Paludina grana,	378	Ranella caudata,	236
integra,	174		
lustrica,	175	S.	
Paludina ponderosa,	173	Saxicava distorta,	318
porata,	174	Scalaria lineata,	242
Pandora trilineata,	261	Sciæna grisea,	254
Patella amœna,	223	oscula,	252
Pecten concentricus,	259	multifasciata,	255
dislocatus,	260	Scolopendra marginata,	110
Petricola fornicata,	319	viridis,	110
Phalangium dorsatum,	66	Scomberesox equirostrum,	132
grandis,	67	scutellatum,	132
nigrum,	66	Sepia octopa,	101
vittatum,	65	rugosa,	101
Pholas cuneiformis,	322	sepiola,	100
oblongata,	320	varietas,	101
truncata,	321	Sepiola cardioptera,	100
Physa elongata,	171	Smynthurus guttatus,	13
gyrina,	171	Solemya velum,	317
Planorbis armigerus,	164	Solen centralis,	316
campanulatus,	167	costatus,	315
exacnuous,	166	viridis,	316
parallellus,	164	Sphaerocarpus terrestris,	361
Pœcilia multilineata,	4	Sphene,	191
Podura bicolor,	13	Squalus Cuvier,	351
fasciata,	12	elephas,	343
Poligyra plicata,	161	Spallanzani,	351
Pollyxenus fasciculatus,	108	Stevia callosa,	121
Polydesmus granulatus,	107	Strontian, sulphate of, de-	
serratus,	106	scription of chrystals,	300
Pupa armifera,	162	Succinea ovalis,	163
contracta,	374		
exigua,	375	T.	
rupicola,	163	Table spar, description and	
Pyrrula papyratia,	238	analyses of,	182 and 189
		Tegeneria medicinalis,	53
Q.		Tellina alternata,	275
Quartz, new chrystalline		flexuosa,	303
form of,	212	iris,	302
		polita,	276
		tenera,	303

Theodoxus reclivatus,	258	V.	
Trombidium scabrum,	69		
sericeum,	70	Venus elevata,	272
Turbo canaliculatus,	240	Venus castanea,	273
irroratus,	239	inequalis,	273
obligatus,	241	notata,	271
palliatus,	240	præparca,	271
Turbo vestita,	241	Verbena bipinnatifida,	123
Turritella alternata,	243	Vertigo ovata,	375
bisuturalis,	244	pentodon,	376
impressa,	244		
		Z.	
		Zircon,	57

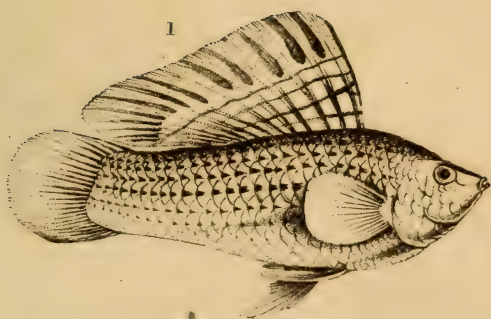


POECILIA.
P. Multilineata.





LEBIA.
L.Ellipsoidea.



MOLLIENISIA.
M. Latipinna.





11.



1



2

EXOCE TUS.

1.E. Nuttallii.

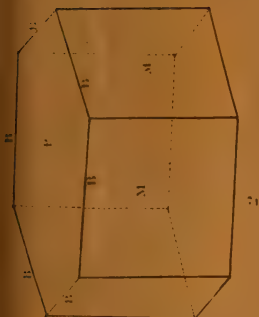
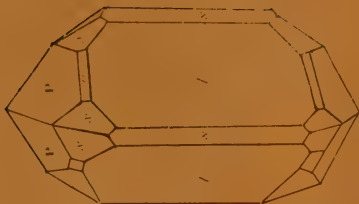
2.E. Fasciatus.



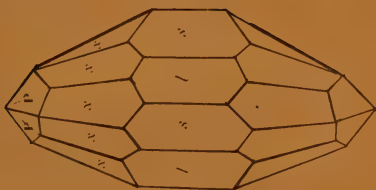
5



6



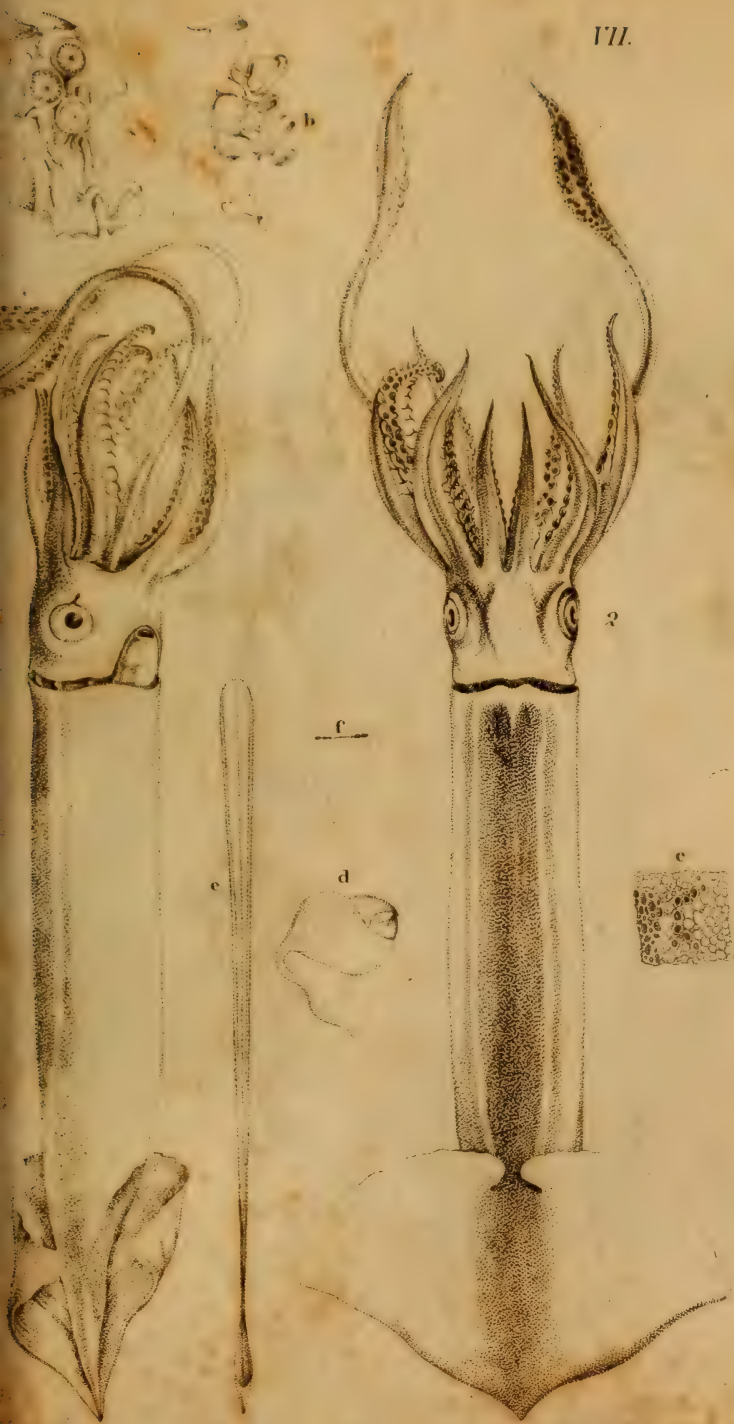
9

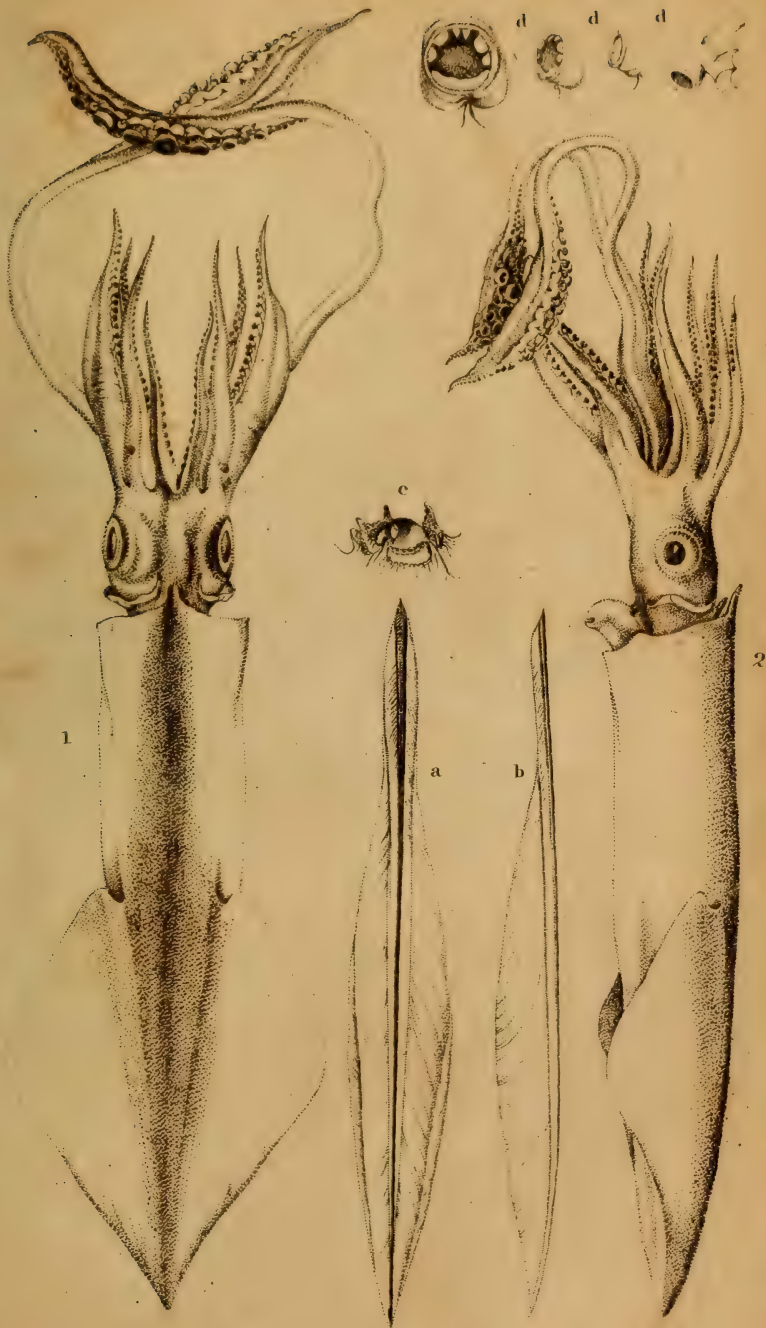




L. CYCLURA.

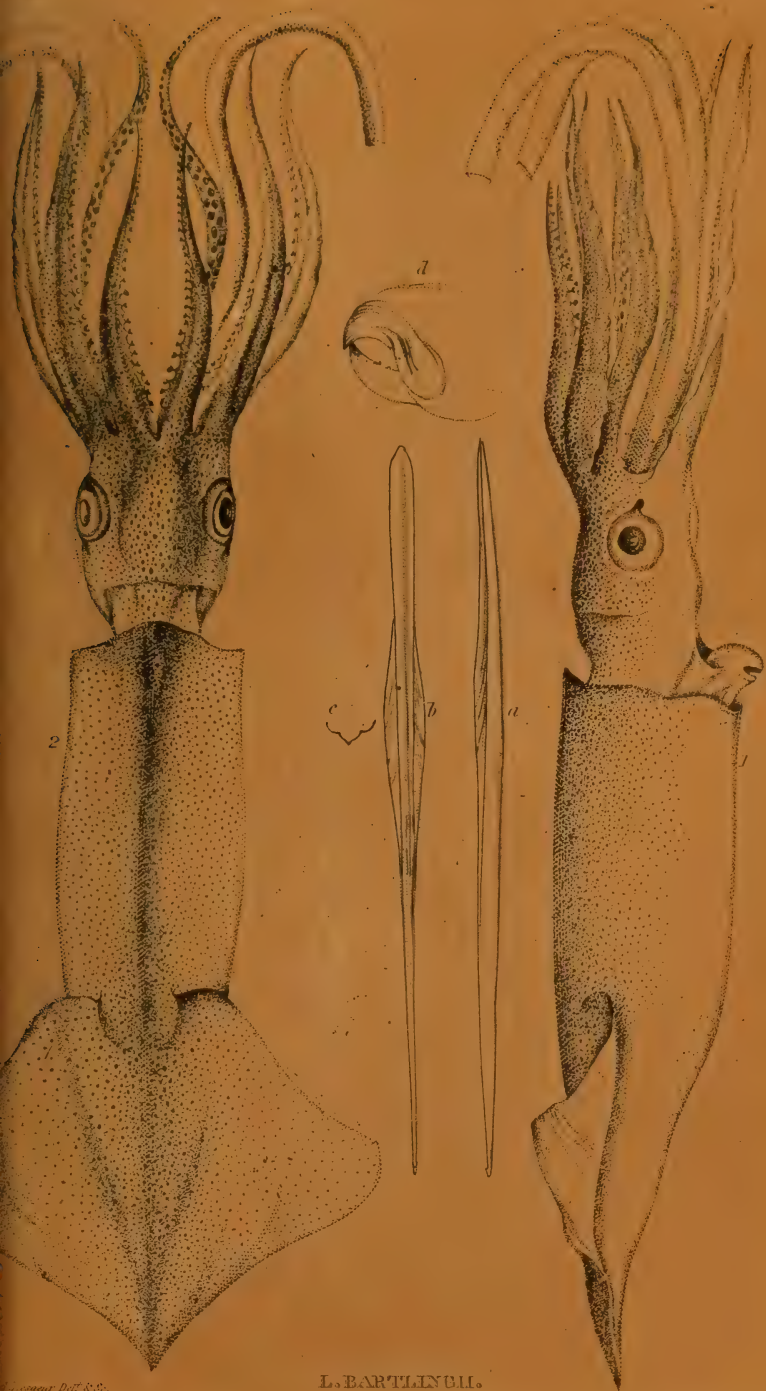






PELLEI.



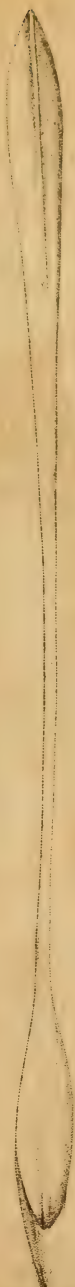
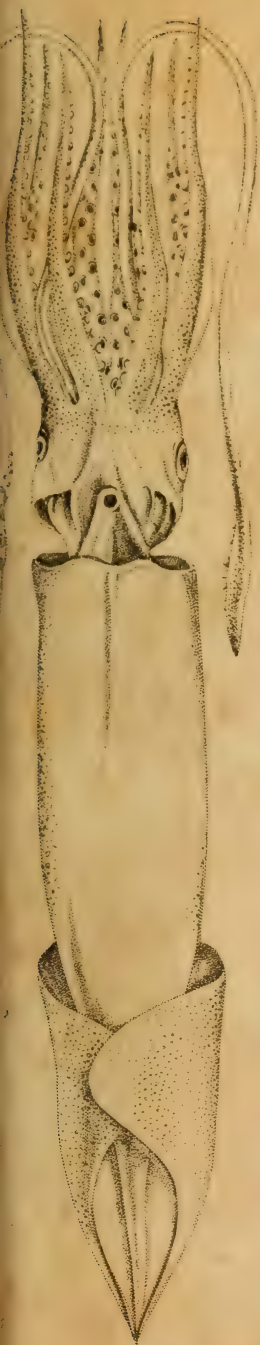




No. 1000. Feb. 18. 1861.

L. LIG. PWD.





L. ILLECEBROSA



IX.



ONYKIA CARIBÆA
1 & 2

ONYKIA ANGULATA
3

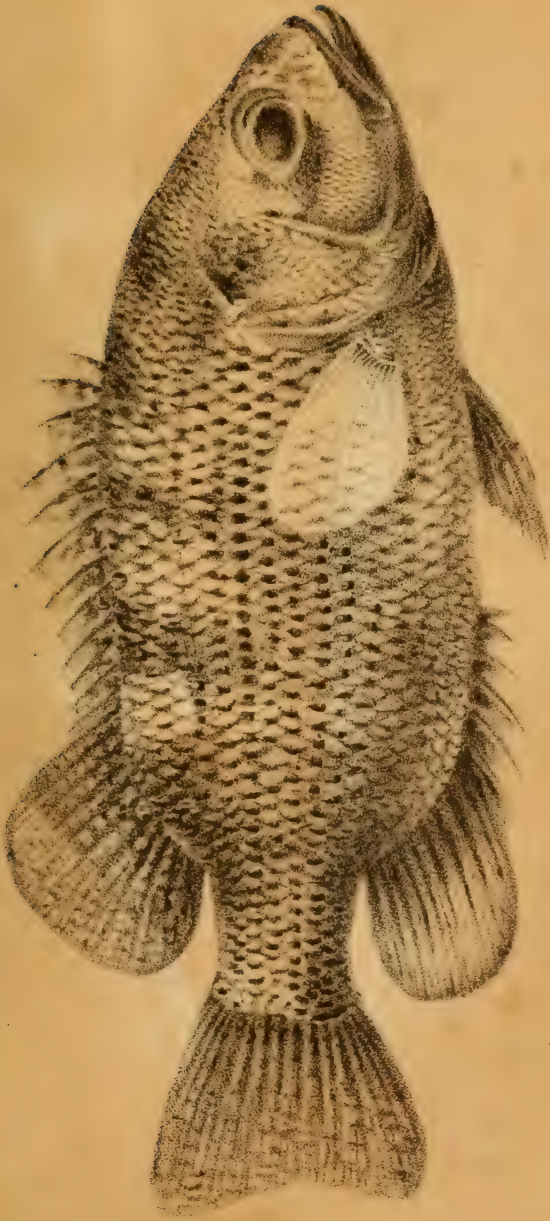








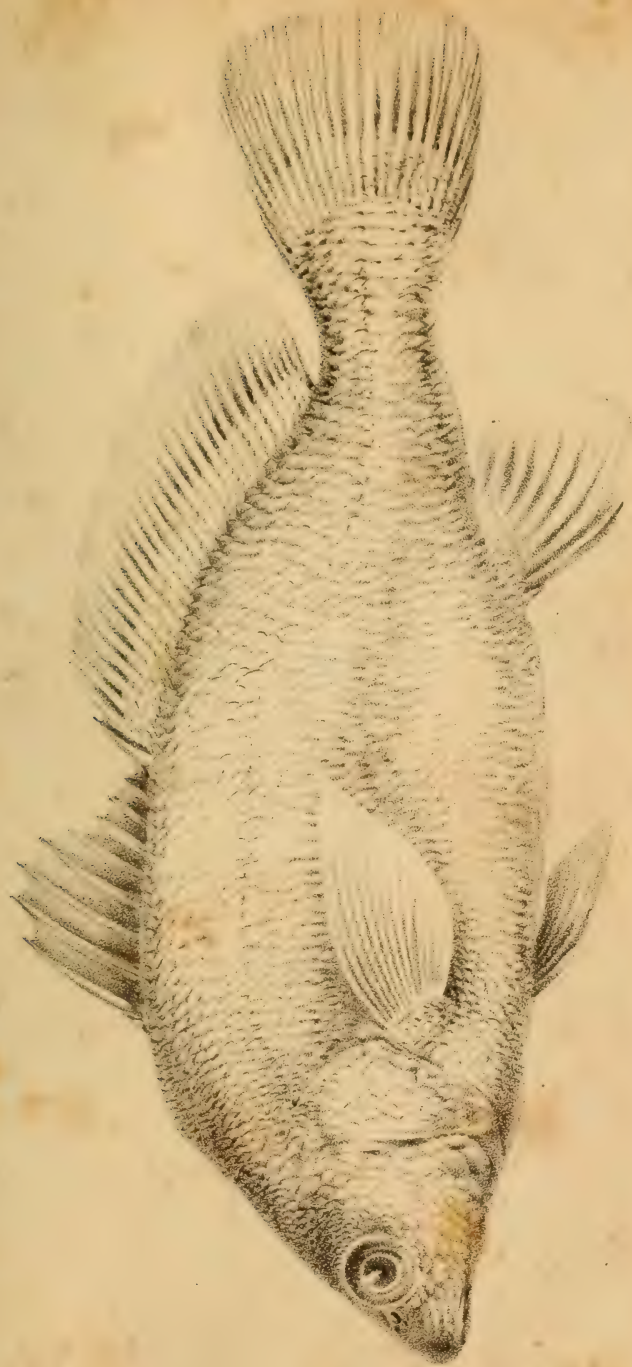
B. TRUNCATA



CICHLA. AEN^{TA}.

C. A. Lesueur del.





SC. OSCULA.

C. A. Lesueur deli.



Fig. 2.

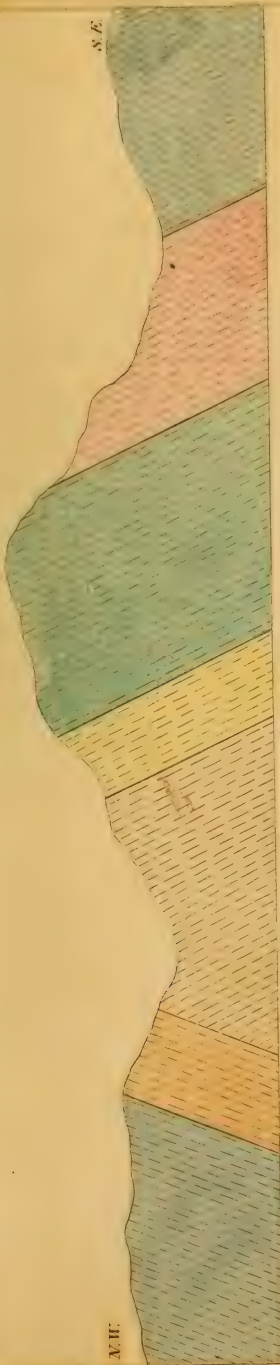
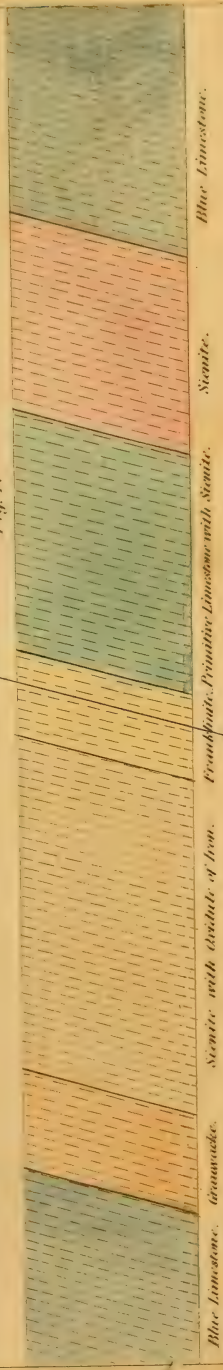
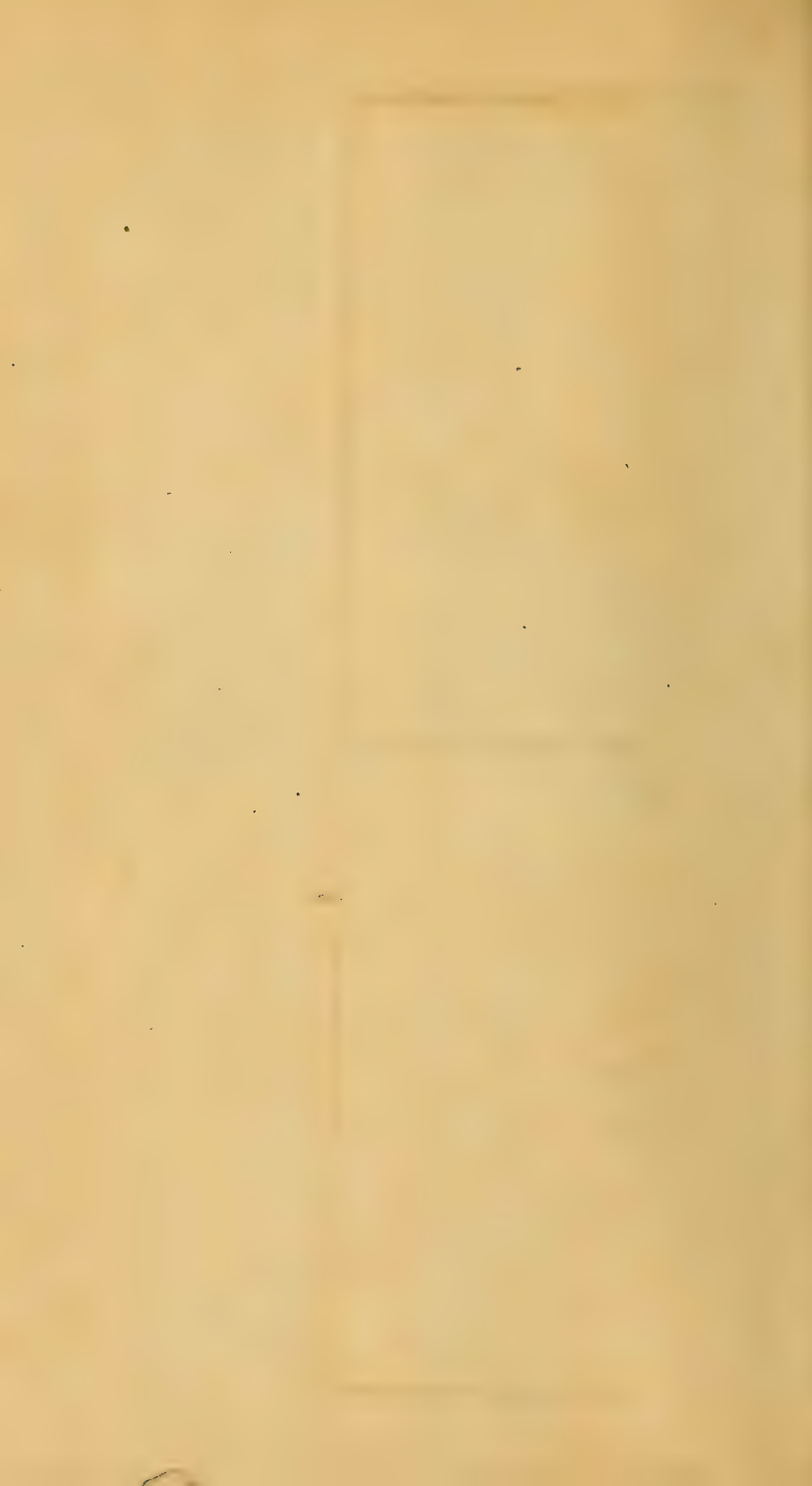
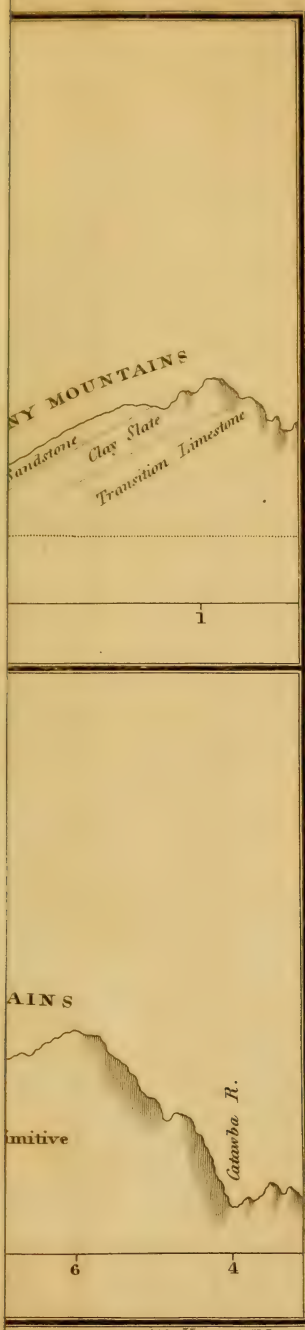


Fig. 1.

N.E.

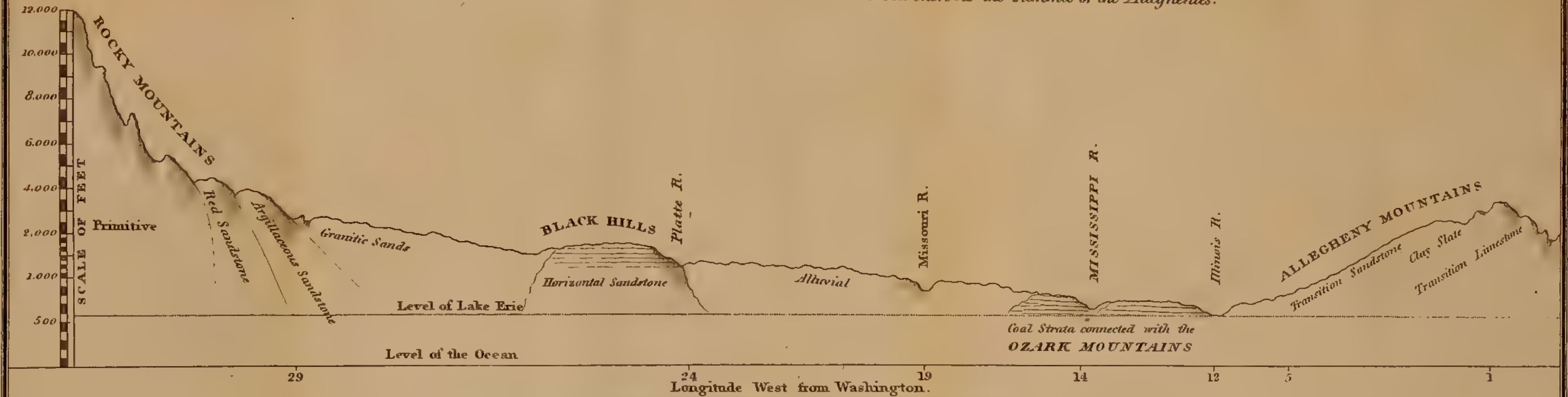






Engraved by Young & Delleker

VERTICAL SECTION on the PARALLEL of LATITUDE 41 degrees North
intended as a continuation of MACLURE'S third Section from the sea-shore to the summit of the Alleghenies.



VERTICAL SECTION on the PARALLEL of LATITUDE 35 degrees North
intended as a continuation of MACLURE'S fifth Section.

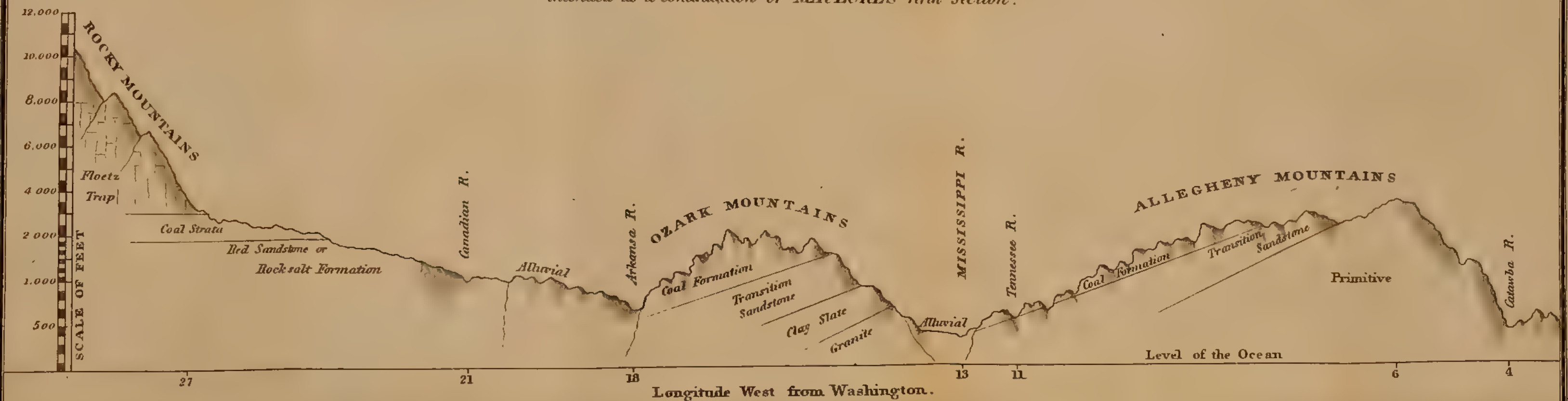
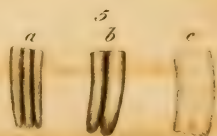


Fig. 1.







Lower jaw Teeth.



Upper jaw Teeth.



Fig. I. Sphaerocarpus terrestris.

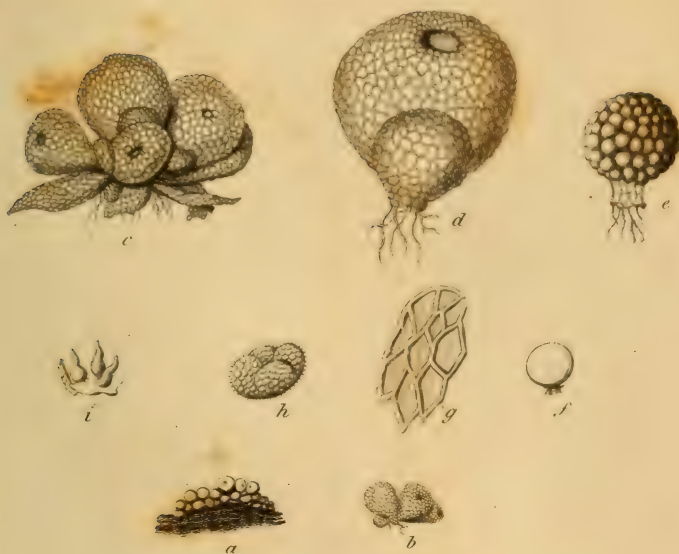
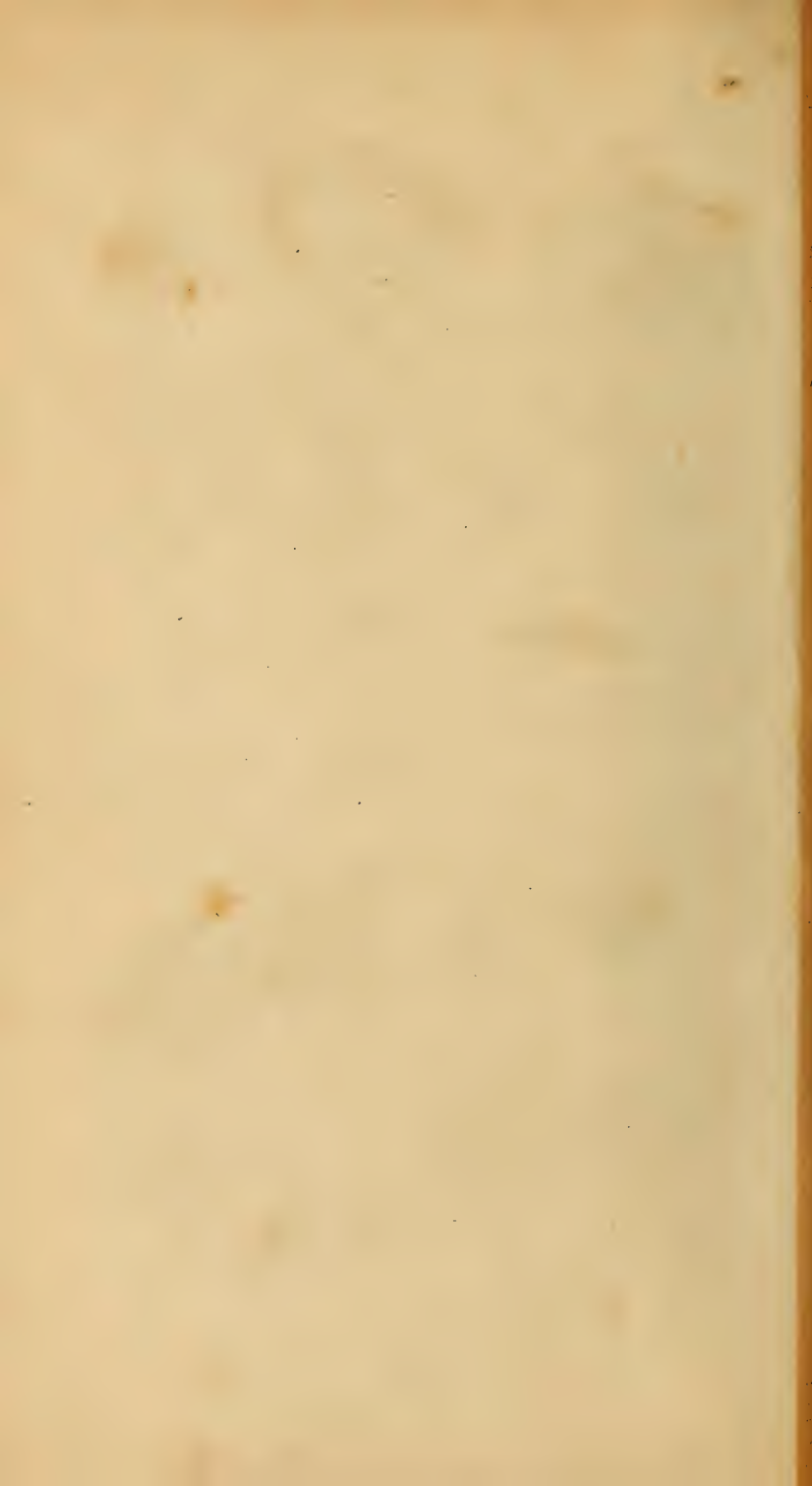


Fig. II. Carpopobolus orbicularis.





SMITHSONIAN INSTITUTION LIBRARIES



3 9088 01313 4580